



GOVERNOR'S COMMISSION
TO REVIEW CALIFORNIA WATER RIGHTS LAW

GROUNDWATER RIGHTS IN CALIFORNIA

Background and Issues

by

Anne J. Schneider

Staff Paper No. 2

July 1977

THIS PAPER HAS NOT BEEN REVIEWED
OR APPROVED BY THE COMMISSION

This paper is part of a series of background and issue papers prepared by the staff of the Governor's Commission to Review California Water Rights Law. The background material is intended to assist persons who may lack detailed knowledge of California's water rights law and procedures. The issues have been listed as a basis for discussion by the public and for the Commission when it considers various legislative options. Initial papers in the series are as follows:

Staff Paper No. 1: Appropriative Water Rights
in California

Staff Paper No. 2: Groundwater Rights in
California

Staff Paper No. 3: Legal Aspects of Water
Conservation in California

Staff Paper No. 4: Riparian Water Rights in
California

Staff Paper No. 5: The Transfer of Water Rights
in California

Staff Paper No. 6: Legal Aspects of Instream
Water Uses in California

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Governor's Commission to Review
California Water Rights Law
P. O. Box 100
Sacramento, CA 95801

Phone: (916) 445-5240

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GROUNDWATER RIGHTS IN CALIFORNIA

I. Introduction

California groundwater resources are extremely valuable. California uses about 15 million acre feet of groundwater each year, which comprise roughly 40 percent of the State's yearly applied water needs.^{1/} The rate at which groundwater basins are naturally recharged does not keep up with groundwater pumping. An average annual overdraft of 2.2 million acre feet occurs each year.

About 40 percent of California overlies groundwater basins.^{2/} The usable storage capacity of these basins is approximately 143 million acre feet. A substantial volume of empty groundwater storage space is available in many areas of the State: The estimated empty capacity of the San Joaquin and Tulare Basins is 45,500,000 acre feet; the Chino Basin contains an estimated 1,800,000 acre feet of empty storage space.^{3/}

The geology, hydrology, and water quality of groundwater basins are generally complex. Basin characteristics vary a great deal from basin to basin throughout California. Extensive data are required to identify basin boundaries, monitor groundwater quality, and determine the characteristics of groundwater movement for each aquifer in a basin.

When the California Conservation Commission was considering the task of including a statutory system for groundwater in the Water Commission Act of 1913, it concluded that "well considered statute laws" should govern

^{1/} These statistics were compiled by the California Department of Water Resources in Bulletin No. 118, California's Ground Water 3 (1975).

^{2/} See Appendix.

^{3/} California Department of Water Resources, Bulletin No. 118, California's Ground Water 129, Table 1 (1975).

groundwater.^{4/} But the Commission decided that the subject matter was "so vast" that it "had neither the time nor the funds necessary to make a satisfactory investigation of it."^{5/} Only "subterranean streams flowing through known and definite channels" were included in the permit system and made subject to the general statutory adjudication procedure.^{6/} Percolating groundwater, which comprises nearly all of the state's groundwater, was not included.^{7/}

Ever since the Conservation Commission's report, the question whether comprehensive groundwater legislation should be enacted has been debated in California.^{8/} Meanwhile, most other western states have provided for state control over groundwater,^{9/} usually in ways which accord with the recommendation of the National Water Commission that surface water and groundwater

^{4/} California Conservation Commission, Report 31 (1913).

^{5/} Id.

^{6/} Water Commission Act, ch. 586, sec. 42, 1913 Cal. Stats. 1012; Cal. Water Code Sections 1200, 2500 (West 1971).

^{7/} In California, groundwater is presumed to be percolating. City of Los Angeles v. Pomeroy, 124 Cal. 597, 628, 633, 57 P. 585, 596, 598 (1899).

^{8/} See discussion at page 91, below.

^{9/} ⁵ R. Clark, Waters and Water Rights 414, n.27 (1972) reports that an appropriation permit system is applicable to percolating groundwater to some extent in the following western states (usually with exceptions for groundwater used for "domestic purposes"): Alaska (Alaska Stat. Sec. 46.15.260(5) (1971)); Arizona (Ariz. Rev. Stat. Sec. 45-101, Sec. 45-301 et seq. (West Supp. 1977)), Colorado (Colo. Rev. Stat. Sec. 37-90-101 et seq. (1973)), Idaho (Idaho Code Sec. 42-226 (1977)), Kansas (Kan. Stat. Sec. 82a-701 et seq. (1969)), Montana (Mont. Rev. Codes Ann. Sec. 89-2911 et seq. (1975 Supp.)), Nevada (Nev. Rev. Stat. Sec. 534.010 (1973, 1975)), New Mexico (N.M. Stat. Ann. Sec. 75-11-1 (1968 and 1975 Supp.)), North Dakota (N.D. Cent. Code Sec. 61-01-01 (1960)), Oklahoma (Okla. Stat. Ann. Tit. 82, Sec. 1020.1 et seq. (1976 Supp.)), Oregon (Or. Rev. Stat. Sec. 537.505 (1975)), South Dakota (S.D. Compiled Laws Ann. Sec. 46-6-1 et seq. (1967 and 1976 Supp.)), Utah (Utah Code Ann. Sec. 73-1-1 et seq. (1968 and 1975 Supp. and 1976 Interim Supp.)), Washington (Wash. Rev. Code Ann. Sec. 90.14 (1976 Supp.)), Wyoming (Wyo. Stat. Sec. 41-121 et seq. (1957 and 1975 Supp.)).

rights "should be integrated", and that there "should not be separate codifications of surface water law and groundwater law."^{10/}

Most of California's groundwater law has been developed by the judiciary. The statutory law is sparse. Groundwater recordation requirements apply only in four Southern California counties.^{11/} Groundwater basin adjudications initiated by the State are authorized only where it is determined that destruction or irreparable injury to basin water quality is threatened.^{12/} This authority, enacted in 1969, has never been used. Pump taxes have been authorized by amendments to particular water district acts.^{13/} In general, existing legislation has been narrowly drawn to deal with specific local problems.

II. California's Groundwater Law

A. Elements of Basic Groundwater Law

1. The Overlying Use Right and the Development of the Correlative Rights Doctrine

a. Rejection of the Common Law Rule

In a 1903 case, Katz v. Walkinshaw,^{14/} the California Supreme Court rejected the English common law doctrine of groundwater rights. The common law rule, first enunciated in Acton v. Blundell,^{15/} was that percolating groundwater was governed by the rule of land law that the landowner owns everything that lies beneath the surface of his land. The court in Acton v. Blundell had used this rule of land law rather than the rules applied to

^{10/} United States National Water Commission, Water Policies for the Future 233 (1973).

^{11/} Cal. Water Code Section 4999 et seq. (West 1971).

^{12/} Cal. Water Code Section 2100 et seq. (West 1971).

^{13/} Districts with pump tax powers are listed in notes 158, 159, 160, 161, and 162 below.

^{14/} Katz v. Walkinshaw, 70 P. 663 (1902); 141 Cal.116., 74 P. 766 (1903).

^{15/} Acton v. Blundell, 152 Eng. Rep. 1223 (Ex. 1843).

watercourses on the assumption that the movement of percolating groundwater could not be ascertained. The English court held that one landowner would have no cause of action against another landowner whose well interfered with the one landowner's well.

In Katz v. Walkinshaw, the court concluded that the common law rule of absolute ownership of percolating groundwater is not suitable to California. It discussed Southern California's chronic water shortage and decided that a rule of reasonable use should be applied. The court stated that percolating groundwater is not an "hitherto unused supply" and that "[t]he danger of exhaustion [of groundwater sources]... threatens surface streams as well as underground percolations and reservoirs."^{16/}

Where the total water supply including surface water and groundwater is limited, the court decided that it is necessary to have a doctrine which protects existing investment and provides certainty for future capital expenditure. Under the common law rule, a landowner had "absolutely no protection in law against others having stronger pumps, deeper wells, or a more favorable situation, who can thereby take from them unlimited quantities of the water, reaching to the entire supply, and without regard to the place of use."^{17/} As the court noted in a subsequent case, the common law rule was "unsuited to our conditions and would constantly tend to produce injustice and render insecure the title to water supplies devoted to beneficial use."^{18/}

^{16/} Katz v. Walkinshaw, 141 Cal. 116, 126, 74 P. 766, 768. (1903).

^{17/} Id. at 133, 74 P. at 771.

^{18/} Barton v. Riverside Water Co., 155 Cal. 509, 516, 101 P. 790, 793 (1909).

b. Analogy to the Riparian Doctrine

In the first Katz v. Walkinshaw opinion, Justice Temple drew an analogy between the rights of overlying users and riparians.^{19/} He called the exercise of overlying and riparian rights a question of reasonable use:

A riparian owner may not divert the water, because he would thereby injure his neighbors who have equal rights in the stream. Still he may take a reasonable amount from the stream for domestic purposes, and that may equal the entire flow, although he thereby injures his neighbors. It is a question of reasonable use, and that applies both to the land of the person disturbing the percolation and to the adjoining land.^{20/}

In the second opinion, Justice Shaw restated the doctrine of reasonable use as it applied to overlying users: "It limits the right of others to such amount of water as may be necessary for some useful purpose in connection with the land from which it is taken."^{21/} Then, in elaborate dicta, Justice Shaw described what he called the "rule of correlative rights":

Disputes between overlying landowners, concerning water for use on the land, to which they have an equal right, in cases where the supply is insufficient for all, are to be settled by giving to each a fair and just proportion.

....

The objection that this rule of correlative rights will throw upon the court a duty impossible of performance--that of apportioning an insufficient supply of water among a large number of users, is largely conjectural.^{22/}

^{19/} Katz v. Walkinshaw, 70 P. 663, 666 (1902).

^{20/} Id. W. Hutchins, The California Law of Water Rights 220 (1956), indicates that a riparian may use all the water necessary for "natural" uses --domestic uses and the watering of domestic stock. However, a riparian has only a correlative right to water used for "artificial" uses --irrigation, watering herds of stock, and industrial uses.

^{21/} Katz v. Walkinshaw, 141 Cal. 116, 134, 74 P. 766, 771 (1903).

^{22/} Id. at 135, 74 P. at 772.

A leading authority suggested that the court, in the second opinion, decided that the doctrine of reasonable use would have to be amplified considerably in response to California's ever-increasing water needs.^{23/} The rule of correlative rights was superimposed upon the doctrine of reasonable use, resulting in what has come to be called the doctrine of correlative rights:

In the exposition of that doctrine, the courts have stated that the owners of tracts that overlie a common supply of percolating water have correlative rights in the common supply; and that the exercise of one's correlative right entitles him to make a reasonable use of the water for the benefit and enjoyment of his overlying land. These correlative rights belong to all overlying landowners in common, and each may use only his reasonable share when the water is insufficient to meet the needs of all.

The term reasonable use as employed in the California percolating water cases 'does not mean that one of two or more persons having correlative rights in a common supply of water may take all that is reasonably beneficial to his land, regardless of the needs of the others,... but only his reasonable share thereof, if there is not enough to supply the needs of all'.^{24/}

c. Overlying Use Rights

i. Definition of the Overlying Use Right

The Constitutional Amendment of 1928, which requires that water be put to reasonable and beneficial use,^{25/} applies to owners of groundwater rights.^{26/} The correlative rights doctrine and the 1928 Amendment together provide that an owner of land overlying a groundwater basin has a right to the reasonable, beneficial use of a reasonable share of the basin's groundwater for use on or in connection with his overlying land.

^{23/} W. Hutchins, supra note 20, at 447.

^{24/} Id. at 447 (emphasis in original).

^{25/} Cal. Const. art. 10, sec. 2.

^{26/} Peabody v. City of Vallejo, 2 Cal.2d 351, 383, 40 P.2d 486, 499 (1935).

California appellate decisions have not, however, clearly defined what is "overlying land" or how the boundaries of a "groundwater basin" are determined.^{27/} The court in City of Pasadena v. City of Alhambra (Pasadena) stated that "an overlying right...is the right of the owner of the land to take water from the ground underneath for use on his land within the basin or watershed...."^{28/} This statement implies that overlying use encompasses use on land within the boundaries of a groundwater basin, whether or not groundwater actually can be pumped from beneath the particular parcel of land overlying a basin.

Several cases have defined certain aspects of "overlying use." "Overlying use" is not always equivalent to use on overlying land; some uses on overlying land have been held to be non-overlying, "appropriative"

^{27/} See Appendix. The definition of "groundwater basin" is a major issue in Estrem v. Edson, Civil No. 13602 (Cal. Super. Ct., Lake County) in which the court has appointed the State Water Resources Control Board as referee.

^{28/} City of Pasadena v. City of Alhambra, 33 Cal 2d 908, 925, 207 P. 2d 17, 28 (1949) [hereinafter cited as Pasadena v. Alhambra].

uses. Public use of groundwater is generally not an overlying use; municipalities, for example, usually have primarily appropriative rights to groundwater.^{29/}

The basis of the distinction between public and private use of groundwater was explained in City of San Bernardino v. City of Riverside.^{30/} The plaintiff, City of San Bernardino, argued that the particular basin's groundwater was "subject to public use for the common benefit of the overlying lands and of the inhabitants of the basin", and "that the city has in some manner become the administrator of this public or common use in place of the land owners and has become substituted to their individual rights for the benefit of all...."^{31/}

^{29/} W. Hutchins, supra note 20, at 458, states that: "Public use of percolating water is a non-overlying use, whether the lands that receive such public service are overlying lands or whether they are located outside of the groundwater area. Such public use is therefore an appropriative use of the water." In support of this statement, Hutchins discusses City of San Bernardino v. City of Riverside, 186 Cal. 7, 198 P. 784 (1921); Eden Township Water District v. City of Hayward, 218 Cal. 634, 24 P.2d 492 (1933); Pasadena v. Alhambra; and Burr v. Maclay Rancho Water Co., 160 Cal. 268, 116 P.715 (1911). The court in City of San Bernardino v. City of Riverside held that "The plaintiff is not substituted to nor entitled to use the water or water rights of the owners of land within its limits unless it has acquired such right directly or indirectly from such land owners, and then only for use on the particular land of such owner." (186 Cal.7, 31, 198 P. 784, 794 (1921)). The court has found that the cities involved in the litigation had not "taken any steps to acquire rights to take water from the basin except by acquiring tracts of land therein and boring wells in such land. The purchase of the land conferred no water right upon the buyer except the right to take water for use on the land itself." (Id. at 26, 198 P. at 792). The municipality was exercising an overlying right, therefore, only to the extent that it used groundwater on city-owned land overlying the groundwater basin.

^{30/} City of San Bernardino v. City of Riverside, 186 Cal. 7, 198 P.784 (1921). See also Eden Township Water District v. City of Hayward, 218 Cal. 634, 24 P.2d 492 (1933).

^{31/} City of San Bernardino v. City of Riverside, 186 Cal. 7, 24, 198 P. 784, 791 (1921).

The court rejected the argument. It reasoned that water is "part of the land and...no more public property, or subject to public or common use, than was the land."^{32/} The court implied that if a municipality acquired rights to groundwater from overlying owners within its service area, its use of that water for delivery to those owners would be an overlying use.

ii. No Priority System for Overlying Uses

An overlying user does not obtain any priority over adjacent overlying users solely by pumping first from the common supply.^{33/} In Burr v. Maclay Rancho Water Co., the court protected the defendant's unexercised overlying right against the plaintiff who was exercising his overlying right; their overlying rights were equal and correlative regardless of the fact that one right was not yet being exercised.^{34/}

^{32/} Id. at 25, 198 P. at 792.

^{33/} W. Hutchins, supra note 20, at 438. Hutchins cites as authority for this statement Hudson v. Dailey, 156 Cal. 617, 628, 105 P. 748, 753 (1909) and Burr v. Maclay Rancho Water Co., 160 Cal. 268, 281, 116 P. 715, 722 (1911). Katz v. Walkinshaw had left the issue open (141 Cal. 116, 136, 74 P. 766, 772 (1903): "[W]e leave for future settlement the question as to the priority of rights between such [overlying] owners who begin the use of the waters at different times."

^{34/} Burr v. Maclay Rancho Water Co., 160 Cal. 268, 281, 116 P. 715, 722 (1911).

iii. Overlying Rights in Overdrafted Basins

Several aspects of the status of exercised and unexercised overlying rights in groundwater basin adjudications have been clarified by City of Los Angeles v. City of San Fernando (San Fernando)^{35/} and Tehachapi-Cummings County Water Dist. v. Armstrong.^{36/} Pasadena left open the issue of whether an overlying user in an overdrafted basin retained his original overlying rights by continuing to pump or obtained new prescriptive rights.^{37/} The court in the San Fernando case indicated that this choice has been settled and that overlying owners retain their rights by using them.^{38/}

San Fernando also clarifies the extent to which prescriptive rights can be obtained against overlying users. Overlying users have three ways to protect their rights against loss by prescription: before a basin is overdrafted, an overlying owner can obtain a declaratory judgment that establishes his paramount overlying right against nonsurplus appropriations;^{39/} as soon as overdraft begins, an overlying user can obtain injunctive relief against nonsurplus appropriations;^{40/} and, an overlying user can retain his right to the extent that he exercises his right during the prescriptive period. By pumping at any time during the prescriptive period, an overlying owner can retain his proportionate share of the safe yield:

^{35/} City of Los Angeles v. City of San Fernando, 14 Cal.3d 199, 537 P.2d 1250, 123 Cal. Rptr. 1 (1975) [hereinafter cited as Los Angeles v. San Fernando].

^{36/} Tehachapi-Cummings County Water Dist. v. Armstrong, 49 Cal. App.3d 992, 122 Cal. Rptr. 918 (1975).

^{37/} Pasadena v. Alhambra, 33 Cal.2d 908, 932, 207 P.2d 17, 32 (1949).

^{38/} Los Angeles v. San Fernando, 14 Cal.3d 199, 293, 537 P.2d 1250, 1318, 123 Cal. Rptr. 1,69 (1975).

^{39/} Burr v. MacLay Rancho Water Co., 154 Cal. 428, 98 P. 260 (1908).

^{40/} Los Angeles v. San Fernando, 14 Cal.3d 199, 278, 537 P.2d 1250, 1307, 123 Cal. Rptr. 1,58 (1975).

The effect of the prescriptive right would be to give to the party acquiring it and take away from the private defendant against whom it was acquired either (1) enough water to make the ratio of the prescriptive right to the remaining rights of the private defendant as favorable to the former in time of subsequent shortage as it was throughout the prescriptive period (City of Pasadena v. City of Alhambra, supra, 33 Cal.2d at pp. 931-933) or (2) the amount of the prescriptive taking, whichever is less (id. at p. 937).^{41/}

It is not clear whether overlying rights which have never been exercised can be lost by prescription. The court in San Fernando stated that: "Such prescriptive rights [based on appropriative claims] would not necessarily impair the private defendants' rights to ground water for new overlying uses for which the need had not yet come into existence during the prescriptive period."^{42/} The issue appears to be left open. However, in support of the above statement, the court cites an excerpt from Tulare Irrigation District v. Lindsay-Strathmore Irrigation District (Tulare) which provides that overlying owners, as well as riparians, can obtain declaratory judgments that establish that their prospective uses are paramount to the rights of any appropriators. The declaratory judgments allow appropriation to continue but prevent prescriptive rights from ripening against the overlying owner or riparian.^{43/} When read together, San Fernando and Tulare may indicate that an overlying right which has never

^{41/} Id. at 293, 537 P.2d at 1318, 123 Cal. Rptr. at 69.

^{42/} Id. at n.100 (emphasis in original).

^{43/} Tulare Irr. Dist. v. Lindsay-Strathmore Irr. Dist., 3 Cal.2d 489, 525, 45 P.2d 972, 986 (1935).

been exercised would be lost by prescription if an overlying owner did not act to protect or exercise his right.^{44/}

A recent California appellate court decision, Tehachapi-Cummings County Water Dist. v. Armstrong, held that where all parties in a groundwater basin adjudication are overlying owners using the water for overlying uses, the mutual prescription doctrine^{45/} should not be applied.^{46/} Rather, the rights of overlying users must be calculated based on the correlative rights doctrine, where, "if the quantity is insufficient, each is limited to his proportionate fair share of the total amount available based upon his reasonable need."^{47/} And, each owner's proportionate share is "predicated not on his past use over a specified period of time, nor on the time he commenced pumping, but solely on his current reasonable and beneficial need for water."^{48/} In effect, the court concluded that an overlying user's cause of action against another overlying user who pumps more than his correlative share in an overdraft situation cannot be the basis of a prescriptive right.^{49/}

^{44/} This interpretation is reinforced by note 101 in the San Fernando case (Los Angeles v. San Fernando, 14 Cal.3d 199, 293, 537 P.2d 1250, 1319, 123 Cal. Rptr. 1, 70 (1975)): "Even though cities cannot lose their water rights by prescription, their acquisition of prescriptive ground water rights is subject to the limitations stemming from the lawful owner's self help set forth in City of Pasadena v. City of Alhambra, ... 33 Cal.2d at pp. 931-933." The cited excerpt from Pasadena v. Alhambra includes the statement that "The running of the statute ... can effectively be interrupted by self help on the part of the lawful owner of the property right involved."

^{45/} See discussion beginning at page 19 below regarding the mutual prescription doctrine.

^{46/} Tehachapi-Cummings County Water Dist. v. Armstrong, 49 Cal. App.3d 992, 1000, 122 Cal. Rptr. 918, 924 (1975).

^{47/} Id. at 1000, 122 Cal. Rptr. at 924.

^{48/} Id.

^{49/} The court stated (49 Cal.App.3d 992, 1001, 122 Cal.Rptr.918, 924 (1975)): "Without appropriation ... there is no paramount right which can be prescribed against." Prescription, however, typically operates against "co-equal" as well as "paramount" rights. It is well established, for example, that one riparian can prescribe against another riparian. See W. Hutchins, supra note 20, at 323.

There do not appear to be any reported appellate court decisions which directly involve the question of whether an overlying user can protect his means of extracting groundwater against the actions of other overlying users, although Tehachapi - Cummings County Water Dist. v. Armstrong may have implicitly considered this issue. The Cummings Basin was not in a condition of annual overdraft from the 1964-65 water year until 1971, when the trial began.^{50/} The basin had been continually overdrafted from 1950 through 1965, however, and "[a]s a consequence, wells were deepened, some had to be abandoned, the cost of pumping water increased throughout the basin, and the peripheral, watered, alluvial areas underwent a contraction, all of which resulted in injury to those entitled to extract the water."^{51/}

The court held that there was a justiciable controversy in the Cummings Basin, even though there was no annual overdraft, and directed the trial court to adjudicate the rights of overlying owners.^{52/} Presumably, the accumulated overdraft would not be allowed to increase, and therefore, pumpers' existing means of extraction would be protected indirectly.

^{50/} Tehachapi-Cummings County Water Dist. v. Armstrong, 49 Cal. App.3d 992, 998, 122 Cal. Rptr. 918, 922 (1975).

^{51/} Id. at 999, 122 Cal. Rptr. at 923.

^{52/} Id. at 1003, 122 Cal. Rptr. at 926.

2. Overlying Use v. Non-overlying Use

The court's actual holding in Katz v. Walkinshaw concerned the rights of overlying users against the rights of appropriators. The court held:

In controversies between an appropriator for use on distant land and those who own land overlying the water-bearing strata, there may be two classes of such landowners: those who have used the water on their land before the attempt to appropriate, and those who have not previously used it, but who claim the right afterwards to do so. Under the decision in this case the rights of the first class of landowners are paramount to that of one who takes the water to distant land; but the landowner's right extends only to the quantity of water that is necessary for use on his land, and the appropriator may take the surplus. As to those landowners who begin the use after the appropriation, and who, in order to obtain the water, must restrict or restrain the diversion to distant lands or places, it is perhaps best not to state a positive rule until a case arises.^{53/}

^{53/} Katz v. Walkinshaw, 141 Cal. 116, 135, 74 P.766, 772 (1903).

The question of an overlying owner's right to protect his prospective use against an established appropriation was raised in Burr v. Maclay Rancho Water Co.^{54/} The court held that the overlying owner who has never used his overlying right can obtain a declaratory judgment protecting his paramount right.^{55/} The court clearly stated, however, that until the overlying owner's use of his right takes all of the "regular supply", appropriators have the right to use any surplus that exists:

It is not the policy of the law to permit any of the available waters of the country to remain unused, or to allow one having the natural advantage of a situation which gives him a legal right to water to prevent another from using it, while he, himself, does not desire to do so.^{56/}

The court in San Fernando restated the paramount status of overlying rights:

Overlying rights take priority over appropriative rights in that if the amounts of water devoted to overlying uses were to consume all the basin's native supply, the overlying rights would supersede any appropriative claims by any party to the basin's native ground water...except insofar as the appropriative claims ripened into prescriptive rights....^{57/}

Burr v. Maclay Rancho Water Co. also affirmed the overlying user's right to protect his reasonable means of diversion against pumping by an appropriator whose pumping lowers the groundwater levels in the overlying user's wells.^{58/} The court held:

[The judgment] should...be framed so as to prevent the lowering of the permanent level to such an extent that the plaintiff [overlying owner] will be unable to obtain by his pumps sufficient water therefrom for use upon his lands....

....

^{54/} Burr v. Maclay Rancho Water Co., 154 Cal. 428, 435, 98 P. 260, 263 (1908).

^{55/} Id. at 436, 98 P. at 264.

^{56/} Id.

^{57/} Los Angeles v. San Fernando, 14 Cal. 3d 199, 293, 537 P.2d 1250, 1318, 123 Cal. Rptr. 1, 69, 100 (1975)

^{58/} Burr v. Maclay Rancho Water Co., 154 Cal. 428, 438, 98 P. 260, 264 (1908).

[The appropriator shall not] be allowed to take... a quantity that will reduce the water level in plaintiff's wells, during the periods when the plaintiff is herein given the right to pump..., to such an extent that the plaintiff, with pumps operating at the depth of his present pumps and with equal capacity, will be unable to obtain therefrom enough water....^{59/}

3. Non-overlying Use v. Non-overlying Use

In Katz v. Walkinshaw, the court indicated that prior appropriation principles should be applied in disputes between non-overlying users.^{60/} The appropriation which is first in time is first in right, and appropriative rights can be lost by prescription.^{61/}

The court in City of Lodi v. East Bay Municipal Utility District (Lodi) held that a prior appropriator "cannot be compelled to incur any material expense in order to accommodate the subsequent appropriator."^{62/} The court cited Peabody v. Vallejo, which clarifies the limitations on this right:

'The mere inconvenience, or even the matter of extra expense, within limits which are not unreasonable, to which a prior user may be subjected, will not avail to prevent a subsequent appropriator from utilizing his right.'^{63/}

^{59/} Id.

^{60/} Katz v. Walkinshaw, 141 Cal. 116, 135, 74 P. 766, 772 (1903). The court stated:

The principles which, before the adoption of the Civil Code, were applied to protect appropriations and possessory rights in visible streams, will, in general, be found applicable to such appropriations of percolating waters, either for public or private use on distant lands, and will suffice for their protection as against other appropriators. Such rights are usufructuary only, and the first taker who with diligence puts the water in use will have the better right. And in ordinary cases of this character the law of prescriptive titles and rights and the statute of limitations will apply.

^{61/} Id.

^{62/} City of Lodi v. East Bay Municipal Utility District, 7 Cal.2d 316, 341, 60 P.2d 439, 450 (1936).

^{63/} Id., 60 P.2d at 451; Peabody v. City of Vallejo, 2 Cal.2d 351, 376, 40 P.2d 486, 496 (1935), emphasis added to the original quoted passage from Waterford Irr. Dist. v. Turlock Irr. Dist., 50 Cal. App. 213, 221, 194 P. 757, 761 (1920).

4. Physical Solutions

The court in the Lodi case also set out the concept of "physical solutions" to water rights disputes.^{64/} This concept is a basic element of water law, mandated by the 1928 Constitutional Amendment.^{65/} Physical solutions are arrangements made between parties which avoid a waste of water which would be entailed if the paramount water right were upheld and protected absolutely. A physical solution must avoid waste and "at the same time not unreasonably and adversely affect the prior appropriator's vested property right."^{66/} A junior water right holder implements a physical solution by providing the paramount right holder with enough water from a different source to make up for the losses the junior causes.

The courts have a duty to try to work out physical solutions in water rights disputes:

Since the adoption of the 1928 constitutional amendment, it is not only within the power but it is also the duty of the trial court to admit evidence relating to possible physical solutions, and if none is satisfactory to it to suggest on its own motion such physical solution. [Citation]. The court possesses the power to enforce such solution regardless of whether the parties agree.^{67/}

Physical solutions are an important factor in the resolution of water rights disputes. In any determination of the respective rights of overlying users, nonoverlying users, and prescriptive users, it is possible that a physical solution will be imposed on disputing parties.^{68/}

^{64/} City of Lodi v. East Bay Municipal Utility District, 7 Cal. 2d 316, 339, 60 P.2d 439, 449 (1936).

^{65/} Cal. Const. art. 10, sec.2. W. Hutchins, supra note 20, at 497, cites several pre-1928 cases in which physical solutions were involved, but he notes that physical solutions generally become important in implementing the 1928 Amendment.

^{66/} City of Lodi v. East Bay Municipal Utility District, 7 Cal.2d 316,339, 60 P.2d 439, 450 (1936).

^{67/} Id. at 341, 60 P.2d at 450.

^{68/} See discussion of the stipulated judgment approach at page 22, below.

B. Groundwater Basin Management Alternatives

1. The Alternative of "No Action"

Although overlying users have a correlative right to underlying ground-water and could prevent appropriators from taking nonsurplus waters, in many instances they take no action to enjoin non-overlying use of nonsurplus water or to apportion inadequate amounts of groundwater among themselves. Even where well water levels have dropped substantially, pumpers have often chosen to rely on economic restraints, such as well-deepening costs and increased energy costs for longer pump lifts, to eventually stabilize pumping in a basin. One study described the competitive extraction process as follows:

In the absence of special policy measures and actions based upon legal rights, economic forces would ultimately curtail the mining of ground-water reserves. In the case of competitive extraction by a large number of users or water agencies, a falling water table and rising pumping costs would eliminate the less valuable uses progressively until the water table stabilized, with the average rate of replenishment equal to the rate of extraction by the remaining users. With a smaller number of users ... individual pumping units would recognize the increase of future pump lifts caused by their annual drafts, and extractions would be restricted to permit stabilization at a higher water table than without this recognition. The extraction patterns of individual pumpers in some ground-water basins display these competitive adjustments for extended periods. ^{69/}

The "no action" alternative entails the legal risk that prescriptive rights may be perfected by appropriators against overlying users and by later appropriators against earlier appropriators. The holding in San Fernando that, pursuant to Civil Code Section 1007, prescriptive rights cannot be obtained against public utilities, municipalities, and other public entities^{70/} makes the problem of prescription even more significant for

^{69/} J. Bain, R. Caves, and J. Margolis, Northern California's Water Industry 454 (1966).

^{70/} Los Angeles v. San Fernando, 14 Cal.3d 199, 270, 537 P.2d 1250, 1301, 123 Cal. Rptr. 1, 52 (1975). See discussion at page 30, below.

private pumpers.^{71/} A private pumper cannot gain prescriptive rights against a public entity, but a private pumper who continues to pump during a prescriptive period, without taking any other action, can retain only his proportionate share of the natural supply.^{72/}

A pumper who wants to avoid any loss of rights by prescription may seek a declaratory judgment of his rights or an injunction against nonsurplus appropriation. A pumper who wants to avoid loss by prescription may also decide to participate in "some form of mutual nonaggression pact or compromise...",^{73/} which generally means forming a water management organization.

2. The Adjudication Alternative

a. The Origin of the Mutual Prescription Doctrine--

Pasadena v. Alhambra

Following Katz v. Walkinshaw, the court applied the correlative rights doctrine in adjudicating disputes between individual pumpers.^{74/} Courts increasingly looked for physical solutions to apply when strict adherence to legal doctrines would entail needless waste of water. As one commentator pointed out:

By the mid 1930's it became apparent that steps had to be taken in order to control the total amount of water pumped from the ground

^{71/} See discussion at page 31, below.

^{72/} See discussion at page 10, above.

^{73/} J. Bain, *supra* note 69, at 453.

^{74/} Reis, Legal Planning for Ground Water Production, 38 S. Cal. L. Rev. 484, 487 (1965), states that (referring to the period between Katz v. Walkinshaw and Pasadena v. Alhambra): "The court would enjoin pumping only if and when withdrawals directly interfered with pumping activities of other producers who were prior in right." The accompanying footnote adds that in all the cases which came before the court during that period, the harm claimed was that the right to take water from the basin had been actually interfered with. (*Id.* at n. 12.)

water basins of Southern California. The hit and miss tactics of individually orientated adjudications of ground water rights were not effective in coping with the tremendous disparity between ground water supplies and demands. To remedy this situation, it was again necessary for the Supreme Court to revise the ground water laws of this state. The opportunity to do so presented itself in an action by the City of Pasadena against all of the major pumpers of ground water in the Raymond Basin Area.^{75/}

In Pasadena,^{76/} all substantial pumpers in the Raymond Basin in Southern California were joined in a suit to determine rights to the groundwater basin. Groundwater levels in the basin had been declining for twenty-two of the twenty-four years before suit was filed. The plaintiff argued that extractions from the basin should be limited to the safe yield^{77/} of the basin. It had been established in several cases that a court could limit groundwater extraction from a basin "for the purpose of protecting the supply and preventing a permanent undue lowering of the water table."^{78/}

After the court in Pasadena stated that pumping could be limited to the safe yield of the basin, it set out the main problem of the case, which was to determine "which of the parties should bear the burden of curtailing the total production of the unit to the safe yield...."^{79/}

^{75/} Id. at 487.

^{76/} Pasadena v. Alhambra, 33 Cal.2d 908, 207 P.2d 17 (1949).

^{77/} The concept of safe yield was most recently set out in Los Angeles v. San Fernando 14 Cal.3d 199, 265, 537 P.2d 1250, 1298, 123 Cal. Rptr. 1, 49 (1975). Safe yield is net groundwater recharge, consisting of recharge from natural precipitation and return flow from delivered groundwater and delivered imported water, less losses from subsurface outflow, rising water outflow, evaporation, and infiltration into sewers.

^{78/} Pasadena v. Alhambra, 33 Cal.2d 908, 924, 207 P.2d 17, 27 (1949). The court cited as authority for this statement: "Burr v. MacLay Rancho Water Co., 154 Cal. 428, 438 [98 P. 260]; City of San Bernardino v. City of Riverside, 186 Cal. 7, 16 [198 P. 784]; cf., Allen v. California Water & Tel. Co., 29 Cal.2d 466, 485-486 [176 P.2d 8]." Id., 207 P.2d at 28.

^{79/} Pasadena v. Alhambra, 33 Cal.2d 908, 924, 207 P.2d 17, 28 (1949).

At this point, the court departed from Katz v. Walkinshaw. Although the court recited the legal rights of overlying users and appropriators under the correlative rights doctrine,^{80/} it decided:

Adoption of appellant's position that the water must be allocated... strictly on the basis of priority in time of appropriation would not only ignore the fundamental principle that the statute of limitations runs against persons who fail to act when their rights are invaded, but it would result in an unequal sharing of the burden of curtailing the overdraft in that all pumping conducted under authority of certain of the later appropriations would be completely eliminated, whereas no restriction in amount would be imposed upon pumping based on earlier appropriations. Such a result does not appear to be justified where all of the parties have been producing water from the underground basin for many years, and none of them have acted to protect the supply or prevent invasion of their rights until this proceeding was instituted. Moreover, it seems probable that the solution adopted by the trial court will promote the best interests of the public, because a pro tanto reduction of the amount of water devoted to each present use would normally be less disruptive than total elimination of some of the uses.^{81/}

For a prescriptive right to groundwater to ripen, it must be established that the taking of nonsurplus groundwater was actual, open and notorious, hostile and adverse to the other party, continuous and uninterrupted for the statutory period of five years, and under claim of right.^{82/} All the parties in Pasadena stipulated to all but two of the necessary prescriptive elements: the five year period of adverse user and the nature and extent of the adverse user.^{83/} The court held that lowering of the water table gave all parties notice of the overdraft^{84/} and that the commencement of the overdraft provided the actual adversity necessary for a prescriptive right to be established. The court reasoned that the overdraft provided the element of

^{80/} Id.
^{81/} Id. at 932, 207 P.2d at 32.
^{82/} Id. at 926, 207 P.2d at 29.
^{83/} Id. at 928, 207 P.2d at 30.
^{84/} Id. at 930, 207 P.2d at 31.

adversity because all the pumpers in the basin were injured, even though they pumped all the water they needed:

The injury...did not involve an immediate disability to obtain water, but, rather, it consisted of the continual lowering of the level and gradual reducing of the total amount of stored water, the accumulated effect of which, after a period of years, would be to render the supply insufficient to meet the needs of the rightful owners.^{85/}

The court held:

[P]rescriptive rights were established by appropriations made in the Western Unit subsequent to the commencement of the overdraft, ...such rights were acquired against both overlying owners and prior appropriators, [and]... the overlying owners and prior appropriators also obtained, or preserved, rights by reason of the water which they pumped....^{86/}

Pumping from the basin was limited to the basin's safe yield. All parties were restricted to a proportionate reduction in the highest continuous amount each had pumped and put to beneficial use in any five year period after overdraft began and before the complaint was filed "as to which there had been no cessation of use by it during any subsequent continuous five (5) year period."^{87/}

b. The Mutual Prescription Doctrine in Subsequent Cases --
The Stipulated Judgment Approach

It was generally expected that the mutual prescription doctrine would be applied in groundwater basin adjudications after Pasadena.^{88/} One authority stated:

^{85/} Id. at 929, 207 P.2d at 30.

^{86/} Id. at 933, 207 P.2d at 32.

^{87/} Id. at 922, 207 P.2d at 26.

^{88/} R. Robie, "Statement on the Case Los Angeles v. San Fernando," Address to the California Water Commission, June 6, 1975, at 4.

The reiteration of the doctrine set forth in Pasadena, the apparent acceptance of the equities embodied therein by a vast majority of ground water pumpers, and the continual decline of basin levels increases the certainty that it is solely within this framework that the right to take ground water will hereafter be determined.^{89/}

The mutual prescription doctrine appears to have been a convenient device that courts could use to reach an acceptable result. Courts have emphasized, as the court in Pasadena did, that proportionate reductions in pumping "promote the best interests of the public ..." and "would normally be less disruptive than total elimination of some of the uses."^{90/}

The doctrine provides a useful basis for quantifying pumping rights. Many adjudications, beginning with Pasadena, have followed a pattern of negotiation to find a physical solution, stipulation for judgment, and judgment.^{91/} The first step of this stipulated judgment approach generally has been to apply the mutual prescription formula to the available

^{89/} Reis, *supra* note 74, at 488.

^{90/} Pasadena v. Alhambra, 33 Cal.2d 908, 933, 207 P.2d 17, 32 (1949); California Water Service Co. v. Sidebotham & Son, 224 Cal. App.2d 715, 732, 37 Cal. Rptr. 1, 11 (1964).

^{91/} California Water Service Co. v. Sidebotham & Son, 224 Cal. App.2d 715, 37 Cal. Rptr. 1 (1964) (West Basin).

Central and West Basin Water Replenishment Dist. v. Adams, Civil No. 786656, Cal. Super. Ct., Los Angeles County, October 11, 1965 (Central Basin).

Upper San Gabriel Valley Municipal Water District v. City of Alhambra, Civil No. 924128, Cal. Super. Ct., Los Angeles County, January 4, 1973 (San Gabriel).

Tehachapi-Cummings County Water District v. Armstrong, 49 Cal. App.3d 992, 122 Cal. Rptr. 918 (1975).

Mojave Water Agency v. Abbey, Civil Nos. 130759 and 152413, Cal. Super. Ct., San Bernardino County, dismissed June 7, 1976. This action is known as the "defeated" adjudication.

Chino Basin Municipal Water District v. City of Chino, Civil No. 164327, Cal. Super. Ct., San Bernardino County. Negotiations are continuing in this action.

pumping data.^{92/} By agreeing to apply a formula, the parties have avoided adversary proceedings in many situations where determination of complex appropriative priorities might in any event have been impossible because of insufficient and unreliable data. The judgment serves to "set in legal cement" the terms of the physical solution to which the parties have stipulated.^{93/}

In Pasadena, all of the parties except the appellant worked out a physical solution based on the availability of supplemental Metropolitan Water District of Southern California water.^{94/} An agreement was developed that included water exchange provisions and financial arrangements for obtaining the supplemental water.^{95/} All but one party stipulated to a judgment that allocated the groundwater on the basis of the mutual prescription doctrine and restricted total pumping to the safe annual yield of the basin.^{96/} The court's judgment enforced the terms of the stipulation against all parties, reserved jurisdiction, and appointed a watermaster.^{97/}

^{92/} California Water Service Co. v. Sidebotham & Son, 224 Cal. App.2d 715, 37 Cal. Rptr. 1 (1964).

Central and West Basin Water Replenishment Dist. v. Adams, Civil No. 786656, Cal. Super. Ct., Los Angeles County, October 11, 1965.

Upper San Gabriel Valley Municipal Water District v. City of Alhambra, Civil No. 924128, Cal. Super. Ct., Los Angeles County, January 4, 1973.

^{93/} C. Corker, Ground Water Law, Management and Administration 212 (National Water Commission Legal Study No. 6, 1971).

^{94/} Krieger and Banks, Ground Water Basin Management, 50 Cal. L. Rev. 56, 60 (1962).

^{95/} Id. at 61.

^{96/} Pasadena v. Alhambra, 33 Cal. 2d 908, 916, 207 P.2d 17, 23 (1949).

^{97/} Id. at 935, 207 P.2d at 34.

The provisions of the judgments in subsequent adjudications have provided a great degree of flexibility in controlling pumping. The judgment entered in the West Basin adjudication^{98/} is representative of the physical solutions which have been devised. The judgment provided that total pumping in the basin could be limited to preserve the basin as a common source of water supply if that were "required".^{99/} The court did not, however, set a safe yield figure for the basin. Pumping rights were set without limiting total pumping to a safe yield figure; each pumper was declared to have an "adjudicated right" based on the mutual prescription formula to pump a specified volume of water from the basin.^{100/}

Water which is pumped in excess of the basin's safe yield is made up through the Central and West Basin Replenishment District's replenishment program.^{101/} The West Basin judgment created an "exchange pool" which operates to allow pumpers to meet their total water needs. In addition, the watermaster administers intra-basin transfers of adjudicated rights. The exchange pool arrangement allows pumpers with access to alternate surface water supplies to "release" the water they could have pumped under their adjudicated right so that other pumpers who do not have access to supplemental water can pump more than their adjudicated amount.^{102/}

^{98/} California Water Service Co. v. City of Compton, Civil No. 506806, Cal. Super. Ct., Los Angeles County, August 22, 1961, California Water Service Co. v. Sidebotham & Son, 224 Cal. App.2d 715, 37 Cal. Rptr. 1 (1964).

^{99/} California Water Service Co. v. Sidebotham & Son, 224 Cal. App.2d 715, 723, 37 Cal. Rptr. 1, 6 (1964).

^{100/} Id. at 731, 37 Cal. Rptr. at 10.

^{101/} California Department of Water Resources, Bulletin No. 179-75, Watermaster Service in the West Coast Basin 12 (1975).

^{102/} See discussion at page 50, below.

Not all adjudications which have used the stipulated judgment approach have been successful. The Mojave River adjudication has come to be known as the "defeated" adjudication.^{103/} The complaint in the Mojave case was filed in March 1966, and the case was dismissed in June 1976, after the investment of substantial time and money.^{104/} The adjudication was defeated even though, in 1970, "owners of interests in approximately ninety-five percent of all water rights sought to be adjudicated ... [had] either expressly or implicitly accepted the physical solution embodied in the Proposed Judgment."^{105/}

Pumping and diversions from the Mojave River system had exceeded natural replenishment since before 1951.^{106/} The plaintiff, Mojave Water Agency, was created in 1959 to contract with the Department of Water Resources for State Water Project water which would be used to alleviate the area's overdraft.^{107/} The Agency initiated the Mojave adjudication in order to create a physical

^{103/} Mojave Water Agency v. Abbey, Civil Nos. 130759 and 152413, Cal. Super. Ct., San Bernardino County, dismissed June 7, 1976. [Hereinafter cited as the Mojave Case.]

^{104/} Mojave Case, "Declaration of James H. Krieger in Support of Motion to Advance for Purpose of Commencing Trial", filed November 4, 1970, at 2,5. As of 1970, approximately \$700,000 had been expended by all interested parties and agencies in the Mojave negotiations. Also, as of 1970, the Working Committee had met 56 times. The Working Committee first met on March 15, 1965. It included representatives of all types of Mojave water users, and was the body responsible for framing the Stipulation for Judgment filed with the court August 11, 1970.

^{105/} Mojave Case, "Points and Authorities in Support of Motion to Advance for Purpose of Commencing Trial", filed November 4, 1970, at 4.

^{106/} Mojave Case, "Stipulation for Judgment", filed August 11, 1970, at 2.

^{107/} 1959 Cal. Stats. 5114, ch. 2146, Cal. Water Code App. Section 97-1 et seq. (West 1968). Section 97-15 concerns the Agency's powers to contract for a water supply.

solution to its water supply problem; the Agency's concern was that supplemental water could not be distributed effectively unless the naturally available groundwater and surface water supply were controlled.^{108/} Pumping in excess of adjudicated rights would be subject to a pump tax, and the proceeds would be used to finance the Agency's importation of State Water Project water.^{109/}

The adjudication included all pumpers within the "area of influence" of the Mojave River system,^{110/} where it was determined that deficiencies in the quantity or quality of water existed or were threatened.^{111/} "Production rights" were established for the area of influence on the basis of each water user's highest continual groundwater production during any five consecutive

^{108/} Mojave Water Agency Working Committee, "Minutes", September 17, 1965, Meeting.

^{109/} Mojave Case, "Stipulation for Judgment", filed August 11, 1970, Exhibit 1, at 11. Regarding the water rates to be charged, the Judgment provided (at 12):

Said rates shall, insofar as practicable, reflect the full capital and operating costs of all facilities constructed and operated to deliver supplemental water to areas of deficiency. The Agency shall charge the same rate per acre-foot for excess pumping as the rate charged to customers taking direct deliveries of water from the Agency within the Area of Influence; provided, however, that the Agency may charge different rates for different types of uses. Should the Court curtail the exercise of production rights as provided in Paragraph 1 A (1) of this Judgment, the Agency may levy such charges for excess pumping as will further curtail the use of the natural supplies of water available to the area so as to achieve an equitable physical solution to the water supply problems within the Area of Influence.

^{110/} Id. at 4 defines "area of influence" as "that area within the Mojave Water Agency which is contiguous to the Mojave River and in which either the production, diversion or use of water affects or is affected by the natural available water supply of the Mojave River system." Pumpers of less than ten acre-feet of water annually were not included in the adjudication (Id. at 9). See the discussions of stream system adjudications at page 58, below.

^{111/} Id. at 10.

years during the 15-year period, 1951-1965.^{112/} Pumping rights were not to be curtailed until supplemental water became available, and at that time pumpers would have to either limit pumping to production rights or pay the Mojave Water Agency for water produced in excess of production rights.^{113/}

Major disputes arose throughout the negotiations, including whether the Mojave Water Agency had the power to initiate the adjudication, whether the area of influence was accurately established and who should be joined in the suit, and what provisions should be made for abandonment, transfer, and changes in consumptive use. There was substantial opposition to the proposed judgment by 1974. In December 1974, plaintiff, Mojave Water Agency, decided to stop actively prosecuting the adjudication proceeding.^{114/} Earlier in 1974, the

^{112/} Mojave Case, "Declaration of James H. Krieger in Support of Motion to Advance for Purpose of Commencing Trial", filed November 4, 1970, at 3. Production rights were described in the Mojave Case, "Stipulation for Judgment," filed August 11, 1970, Exhibit 1, at 5 ff. A "production right" was the right to pump or divert water as determined by the Working Committee's Verification Program. A party to the judgment was entitled to produce no more than his production right each year. Production rights were determined to be the greatest amount produced in any five consecutive years between 1951 and 1965. A "limited production right" was a portion of a production right that was equal to the difference (if any) between the total production right and the average quantity pumped between 1961 and 1965. A limited production right would have represented older rights which might not have been used for years. The exercise of limited production rights would have been limited to parcels of land served originally by the original wells, and the water could be used only for the general use for which the right was originally created.

^{113/} Mojave Case, "Stipulation for Judgment", filed August 11, 1970, Exhibit 1, at 11.

^{114/} Mojave Case, "Proposed Pretrial Procedure Order No. 1 (Phase II)", Proposed by Defendant and Cross-Complainant Southern California Water Company, at 3. Following two recall elections in 1974, anti-adjudication suit interests succeeded in electing a majority of seats on the board of the Mojave Water Agency. The San Bernardino Sun-Telegram, February 1, 1976.

Southern California Water Company obtained an order that relieved it from its stipulation for judgment and authorized it to file a cross-complaint, which it filed in order to "assure preservation and implementation of the stipulated form of judgment."^{115/}

It appears that the final blow to the Mojave adjudication effort was dealt by the San Fernando decision. That decision "substantially changed the body of law relied upon by the parties in the negotiations."^{116/} It was believed that the court would not impose the provisions of the proposed judgment, which would have limited pumping on the basis of historical use, on nonconsenting parties.^{117/}

c. The Effect of Los Angeles v. San Fernando on the Mutual Prescription Doctrine

i. Introduction

In 1955, the City of Los Angeles brought suit against the cities of San Fernando, Glendale, and Burbank, and other pumpers, to declare that it had a prior right to all the groundwater in the Upper Los Angeles River Area and to enjoin all other pumpers from extracting the groundwater without Los Angeles' permission.^{118/} A leading authority described the impact of San Fernando:

^{115/} Id. at 2.

^{116/} Mojave Case, "Memo in Support of Motion to Dismiss", filed May 3, 1976.

^{117/} Mojave Case, "Memo in Support of Motion to Dismiss", filed February 1976, by the Southern California Water Company, at 2.

^{118/} Los Angeles v. San Fernando, 14 Cal. 3d 199, 207, 537 P.2d 1250, 1258, 123 Cal. Rptr. 1, 9 (1975).

There is no doubt that the San Fernando case is the most important decision concerning ground water rights that has been handed down by the California Supreme Court in the last 26 years--since the Pasadena case in 1949. But to suggest that San Fernando had any of the shocking qualities of Pasadena is an over-dramatization. In San Fernando, the court was unanimous. We have no ringing dissent employing such terms as 'bureaucratic communism'. Truly, Pasadena was a shock. San Fernando is more a return to well-established laws and traditional water rights.^{119/}

The San Fernando case has made it possible that the mutual prescription doctrine will not be used in the future unless its use is agreed to. As discussed above,^{120/} San Fernando eliminated the possibility left open in Pasadena that rights allotted to overlying owners in that case depended on their having been acquired by prescription. Overlying users retain a proportionate share of the available water by exercising their rights.^{121/} As a result of this and as a result of the court's interpretation of Civil Code Section 1007, mutual prescription can be imposed on parties only in very limited situations.^{122/}

ii. Civil Code Section 1007

The most significant change affecting future use of the doctrine is the court's holding that Civil Code Section 1007 applies in groundwater adjudications.^{123/} Section 1007 provides that neither private parties nor public

^{119/} Mann, The San Fernando Case--Its Impact on Future Ground Water Management, in Proceedings Tenth Biennial Conference on Ground Water 209 (1975) (emphasis in original).

^{120/} See discussion at page 10, above.

^{121/} Los Angeles v. San Fernando, 14 Cal.3d 199, 293, 537 P.2d 1250, 1318, 123 Cal. Rptr. 1, 69 (1975).

^{122/} It appears that the mutual prescription doctrine could still be imposed if all the pumpers in an overdrafted basin are private appropriators. Where all pumpers are overlying owners, see discussion at page 12, above. In a basin in which there are private overlying users and private appropriators, both can lose rights by prescription.

^{123/} Los Angeles v. San Fernando, 14 Cal.3d 199, 270, 537 P.2d 1250, 1301, 123 Cal. Rptr. 1, 52 (1975).

entities can obtain prescriptive rights against public utilities, municipalities, and other public entities.^{124/}

Section 1007 was not an issue in Pasadena.^{125/} Only the single appellant, a public utility, had refused to stipulate to the judgment that allocated the water and restricted total extraction to the basin's safe yield.^{126/} In stipulating, the defendant municipalities gave up their right to raise Section 1007 as a defense to prescription. A Section 1007 defense was not available to the public utility since public utilities were not included in Section 1007 until that section was amended in 1968.^{127/}

Whenever Civil Code Section 1007 is applied in a groundwater adjudication, prescription will not be mutual. A private pumper is in a disadvantageous position. A private pumper cannot obtain prescriptive rights against public

^{124/} Cal. Civil Code Section 1007 (West Supp. 1977) provides:

Occupancy for the period prescribed by the Code of Civil Procedure as sufficient to bar any action for the recovery of the property confers a title thereto, denominated a title by prescription, which is sufficient against all, but no possession by any person, firm or corporation no matter how long continued of any land, water, water right, easement, or other property whatsoever dedicated to a public use by a public utility, or dedicated to or owned by the state or any public entity, shall ever ripen into any title, interest or right against the owner thereof.

The status of mutual water companies under Section 1007 is not clear.
^{125/} Los Angeles v. San Fernando, 14 Cal.3d 199, 271, 537 P.2d 1250, 1302, 123 Cal. Rptr. 1, 53 (1975). The court adds that there are no appellate precedents on the issue of whether Civil Code Section 1007 applies in groundwater adjudications.

^{126/} Pasadena v. Alhambra, 33 Cal.2d 908, 916, 207 P.2d 17, 23 (1949). California-Michigan Land and Water Company, the one defendant, was a public utility.

^{127/} 1968 Cal Stats. 2125, ch. 1112.

entities and public utilities, but public entities and public utilities can obtain prescriptive rights against a private pumper unless the private pumper obtains declaratory, injunctive, or other relief.^{128/}

Public pumpers are now in an uncertain position vis-à-vis other public pumpers. Public entities and public utilities cannot gain prescriptive rights against each other. If a public pumper's right is based on appropriative priorities, a later public pumper may be in a significantly less advantageous position than he would have been in if the mutual prescription doctrine were applied.

iii. Overdraft

San Fernando also clarified the definition of overdraft. In Pasadena, a basin was overdrafted if pumping "operated progressively to reduce the total available supply...;" an overdraft existed when pumping exceeded the basin's safe yield.^{129/} In San Fernando, the court held that there is an overdraft when extractions exceed safe yield plus "temporary surplus."^{130/} Temporary surplus is the amount of water that can be pumped from a basin to provide storage space for surface water that would be wasted during wet years if it could not be stored in the basin.^{131/}

^{128/} By continuing to pump, an overlying user can retain his proportionate share of the natural supply. See discussion at page 10, above.

^{129/} Pasadena v. Alhambra, 33 Cal.2d 908, 929, 207 P.2d 17, 30 (1949).

^{130/} Los Angeles v. San Fernando, 14 Cal.3d 199, 280, 537 P.2d 1250, 1309, 123 Cal. Rptr. 1, 60 (1975).

^{131/} In adding that a basin should not be considered to be overdrafted unless pumping exceeded safe yield plus temporary surplus, San Fernando expressly stated an element that the Pasadena court had already been aware of (33 Cal.2d 908, 921, 207 P.2d 17, 26 (1949)):

In this part of the state there is ordinarily a series of wet years followed by a number of dry years, making it necessary during periods of above-normal rainfall to store water for future use. It appears, however, that the ground water storage capacity [of the Raymond Basin] is adequate to store the excess during wet years for the following dry years.

The definition of overdraft was changed because, as the San Fernando court noted, groundwater basin levels tend to "vary in accordance with wide fluctuations in precipitation."^{132/} In calculating safe yield for a particular year, the referee in San Fernando had adjusted calculations concerning basin precipitation using a 29-year base period.^{133/} The court determined that "if a rising level of extractions were halted at the point of the safe yield based on the 29-year average, ensuing heightening of ground water levels during years of higher-than-average precipitation would cause waste."^{134/} As a result, the concept of temporary surplus was expressly added to the definition of overdraft.

The San Fernando court's order also distinguished between native water safe yield and imported water safe yield: "On remand, the basin's safe yield should be apportioned between amounts attributable to (1) native waters produced by precipitation within the ULARA and (2) water imported from outside the ULARA."^{135/} Native water safe yield involves long-term averaging; imported water safe yield can be much more exactly determined.

iv. Notice

The prescriptive period does not start until the party who is prescribed has notice that an overdraft exists. In San Fernando, the court stated:

The commencement of overdraft provides the element of adversity which makes the first party's taking an invasion constituting a basis for injunctive relief to the other party.... But if the other party is not on notice that the overdraft exists, such adverse taking does not cause the commencement of the prescriptive period.^{136/}

^{132/} Los Angeles v. San Fernando, 14 Cal.3d 199, 280, 537 P.2d 1250, 1309, 123 Cal. Rptr. 1, 59 (1975).

^{133/} Id.

^{134/} Id.

^{135/} Id. at 288, 537 P.2d at 1315, 123 Cal. Rptr. at 66 (1975).

^{136/} Id. at 282, 537 P.2d at 1311, 123 Cal. Rptr. at 62 (1975) (emphasis in original).

In Pasadena, the court held that the lowering of water levels in the appellant's wells was "clearly sufficient to justify charging appellant with notice that there was a deficiency rather than a surplus...."^{137/} However, what San Fernando calls "notice of adversity in fact caused by the actual commencement of overdraft"^{138/} will probably involve more than proof of lowered well levels since San Fernando's definition of overdraft as pumping in excess of safe yield plus any temporary surplus^{139/} involves a more complex determination. It may be that, in order to establish notice after San Fernando, a pumper who wants to perfect his prescriptive rights will finance hydrological determinations of overdraft in a basin and, based on that data, actually notify other basin pumpers of the basin's overdraft.

The determination of safe yield, overdraft, and temporary surplus figures can entail complex and expensive geological and hydrological surveys. Besides the significant fluctuations that occur during wet and dry cycles, data are often obsolete by the time they are analyzed because of changes in cultural conditions:

The amount of water that may be safely extracted from a ground water basin is not a fixed quantity, but may vary within rather wide limits as man's activities increase or decrease the supply to and disposal from the ground water body. These activities include, among other things, artificial recharge, regulation of stream flow by surface storage, vegetal cover changes, extension of sewerage systems, paving of stream channels, and sealing of the ground surface by the spread of urbanization.^{140/}

^{137/} Pasadena v. Alhambra, 33 Cal.2d 908, 930, 207 P.2d 17, 31 (1949).

^{138/} Los Angeles v. San Fernando, 14 Cal.3d 199, 283, 537 P.2d 1250, 1311, 123 Cal. Rptr. 1, 62 (1975) (emphasis in original).

^{139/} Id. at 280, 537 P.2d at 1309, 123 Cal. Rptr. at 60.

^{140/} Krieger and Banks, supra note 94, at 57. The variables are referred to collectively as the "cultural conditions" of a basin.

v. Equitable Apportionment and the Mutual Prescription
Doctrine

The court in San Fernando noted that it had been "urged to declare the law in a way that will preserve this [mutual prescription] instrument for future use."^{141/} In reevaluating the mutual prescription doctrine, the court declared that mechanical application of the doctrine "does not necessarily result in the most equitable apportionment of water according to need" and that "[a] true equitable apportionment would take into account many more factors."^{142/} However, the court added that "[t]his does not mean that the Pasadena decision fell short of reaching a fair result on the facts there presented."^{143/}

The court noted that the Pasadena court had applied the doctrine because there were important pumpers who had begun pumping in the Raymond Basin after overdraft had commenced who would have been eliminated entirely if the court had allocated water rights according to priority of appropriation. But in San Fernando:

[T]he amount that each defendant was using at the beginning of overdraft was substantial in relation to such defendant's later use....

Thus, the mutual prescription doctrine was not needed or applied... for the purpose achieved in Pasadena--that of avoiding complete elimination of appropriative rights stemming from uses of recent years in favor of those based on earlier uses.^{144/}

^{141/} Los Angeles v. San Fernando, 14 Cal.3d 199, 265, 537 P.2d 1250, 1298, 123 Cal. Rptr. 1, 49 (1975).

^{142/} Id.

^{143/} Id. at 266, 537 P.2d at 1298, 123 Cal. Rptr. at 49.

^{144/} Id. at 266-267, 537 P.2d at 1299, 123 Cal. Rptr. at 50.

The court recognized an additional problem with mutual prescription:

A possible undesirable side effect of the so-called mutual prescription doctrine is that it may encourage a 'race to the pumphouse' after overdraft commences, each party endeavoring to increase the volume of continuous use on which his prescriptive right will be based.^{145/}

A pumper had an incentive to increase pumping because he expected that his prescriptive right would be based on the volume continuously pumped for a five-year period preceding adjudication. In Southern California, producers continued to increase their pumping even though groundwater levels decreased steadily and even though Metropolitan Water District of Southern California water was available in many cases to supplement their needs.^{146/}

One commentator has suggested:

In advancing the Pasadena rule, the court had sought to encourage senior appropriators and overlying users to assert their right early in the prescriptive period, thus preventing overdraft of the basin. To the extent that the court hoped for such a deterrent effect, it failed to assess the great informational costs associated with ascertaining the point at which overdrafting occurs.... The less costly alternative quickly became obvious: the extraction of greater water so as to preserve the party's rights vis-a-vis other users.^{147/}

The court indicated that the general procedures and concepts worked out in the various basin adjudications should be retained, even if mutual prescription was not. Although apportionment under the mutual prescription doctrine might not be equitable in a particular situation, the practice of retaining

^{145/} Id. at 267, 537 P.2d at 1299, 123 Cal. Rptr. at 50.

^{146/} Krieger and Banks, supra note 94, at 62. The fact that Metropolitan Water District of Southern California water was much more expensive than groundwater was an element in the "race".

^{147/} Case Note, Water Law--A Postscript to the Mutual Prescription Doctrine--City of Los Angeles v. City of San Fernando, 11 Land and Water L. Rev. 131, 139 (1976).

jurisdiction and appointing a watermaster to administer basin rights that were equitably determined should be used.^{148/} And, once the trial court equitably determined basin rights, it should consider the possibility of imposing a physical solution in order to avoid waste.^{149/}

The San Fernando court did not create a new "instrument" to replace mutual prescription. Its instruction to the trial court on remand was broad:

In formulating its findings, conclusions and judgment, the trial court was properly mindful of its constitutional duty to protect the parties' rights in a manner that would minimize waste and maximize beneficial use of the water in controversy.... Although our conclusions require that a new judgment on remand be based on different substantive rights than those adjudicated by the trial court, the same conserving principle should guide the formulation of the new judgment.^{150/}

3. Different Organizational Approaches to Basin Management

a. Water Districts

i. The Impetus for District Formation

Water producers and users in a number of basins have created water organizations or have had water district acts of existing districts amended in self-help efforts to manage groundwater. Immediate problems of salt-water intrusion, critically-lowered water tables, subsidence, and groundwater quality degradation have moved these groundwater basin users to provide local districts with sufficient power and financial capability to respond to such problems.^{151/}

^{148/} Los Angeles v. San Fernando, 14 Cal.3d 199, 265, 537 P.2d 1250, 1298, 123 Cal. Rptr. 1, 49 (1975).

^{149/} Id. at 290, 537 P.2d at 1316, 123 Cal. Rptr. at 67.

^{150/} Id. at 287, 537 P.2d at 1314, 123 Cal. Rptr. at 65.

^{151/} Assembly Interim Committee on Water, California Legislature, Ground Water Problems in California 48 (Vol. 26, Assembly Interim Committee Reports No. 4, December 1962).

Water management organizations have also been used as a tool for redistributing available water to ease the burden which the mutual prescription doctrine's "race to the pumphouse" effect placed on groundwater production. For example, the Metropolitan Water District of Southern California (Metropolitan)^{152/} provides imported water to supplement groundwater supplies. To obtain the imported water, communities must form water organizations that can distribute and finance the imported supply. Many water organizations in Southern California are members of Metropolitan and pay taxes to Metropolitan for the right to purchase imported water. Following the Pasadena decision, many users within Metropolitan's member organizations preferred to maximize pumping rather than to use the imported supply. Metropolitan's favorable pricing policy for replenishment water^{153/} and the in-lieu statutes^{154/} countered the incentive to overdraft to some extent. However, as one commentator observed:

Gradually ... public agencies realized that there was more to existence than collecting taxes and paying them to Metropolitan for the right to receive water. Enabling acts were studied to determine how users could be urged or even compelled to purchase the water for which taxpayers were paying so dearly. The solutions evolved were many and varied.^{155/}

^{152/} Cal. Water Code App. Section 109-1 et seq. (West Supp. 1977).

^{153/} Metropolitan Water District of Southern California, Report No. 912, 1974 Water Pricing Study, Volume 2, ch. 15 (November 1974); Metropolitan Water District of Southern California, Administrative Code, Section 312.3, contains the water rates charged for replenishment, domestic, municipal, and agricultural water as of July 1, 1977. The rates charged for water used to replenish groundwater supplies are lower than those charged for domestic and municipal uses: \$84 per acre foot for treated and \$67 per acre foot for untreated domestic and municipal water; \$58 per acre foot for treated and \$41 per acre foot for untreated replenishment water.

^{154/} See discussion at page 52, below.

^{155/} Krieger and Banks, supra note 94, at 62.

ii. Types of Districts

Water districts appear to be the most frequently used type of water management organization chosen in California to manage groundwater basins.^{156/} Water districts are formed either under general district acts or special district acts. A general district act is an enabling statute which can be used to set up a local district; it does not actually create a specific local district.^{157/} A special district act is a statute that does create a specific local district.

Three general district acts, the Water Replenishment District Act,^{158/} the Water Conservation District Act of 1931,^{159/} and the Municipal Water

^{156/} There are many types of water management organizations in California. According to the Assembly Interim Committee on Water, California Legislature, Study of Water District Laws 17 (Vol. 26, Assembly Interim Committee Reports No. 9, January 1964):

It was estimated in 1962 that there were more than 3700 public and private water entities serving local areas in California. These may be broken down into four major categories of water distribution entities: (1) private water agencies (public utility companies, which are private enterprises operating under public regulation, and mutual water companies, which are non-profit, co-operative enterprises under private ownership formed for the purpose of serving their own members or stockholders); (2) general act districts; (3) special act districts; and (4) municipal water departments.

^{157/} Several general district acts have been tailored to meet specific needs and have been used to form only one district; e.g., only the Metropolitan Water District of Southern California has been formed under the Metropolitan Water District Act (Cal. Water Code App. Section 109-1 et seq. (West Supp. 1977)) and only the Central and West Basin Water Replenishment District has been formed under the Water Replenishment District Act (Cal. Water Code Section 60000 et seq. (West 1966)).

^{158/} Cal. Water Code Section 60300 et seq. (West 1966).

^{159/} Cal. Water Code Section 75500 et seq. (West 1966).

District Law of 1911,^{160/} specifically authorize replenishment programs and pump taxes.^{161/} Replenishment and pump tax powers have been added to several special district acts.^{162/}

A serious management problem confronting existing districts is that districts often do not have jurisdiction over a manageable portion of a ground-water basin. As one report emphasized:

[I]t is of utmost importance that the district, no matter what its type, should exercise its replenishment powers over the entire ground water basin or at least a manageable portion of it.^{163/}

Three alternative approaches to establishing a district with sufficient management powers over a manageable portion of a basin have been suggested:^{164/}

^{160/} Cal. Water Code Section 71682 *et seq.* (West 1966) provides for a "water replenishment assessment" which applies, in effect, only to the San Gabriel Basin. Cal. Water Code Section 72140 *et seq.* (West Supp. 1977) authorizes "Chino Basin production assessments" of \$2 per acre foot for the purpose of financing studies and investigations to develop a water resources management plan for the Chino Basin.

^{161/} The County Water District Act, a general district act, was amended in 1961, by special legislation, to give the Alameda County Water District pump tax powers (1961 Cal. Stats. 4092, ch. 1942, as amended).

^{162/} Alameda County Flood Control and Water Conservation District (Cal. Water Code App. Section 55-39 (West 1968)); Kern County Water Agency (Cal. Water Code App. Section 99-14.20 *et seq.* (West Supp. 1977)); Mojave Water Agency (Cal. Water Code App. Section 97-16 (West 1968)); Orange County Water District (Cal. Water Code App. Sections 40-23, 40-27 (West 1966)); San Benito County Water Conservation and Flood Control District (Cal. Water Code App. Section 70-7.1 (West 1968)); Santa Clara County Flood Control and Water Conservation District (Cal. Water Code App. Section 60-26 (West 1968)); Yolo County Flood Control and Water Conservation District (Cal. Water Code App. Section 65-4 (West 1968)). Assembly Bill No. 266, introduced by Assemblyman Suitt and amended March 28, 1977, would give the Desert Water Agency (Cal. Water Code App. Section 100-1 *et seq.* (West 1968)) replenishment assessment powers.

^{163/} Assembly Interim Committee on Water, *supra* note 151, at 46.

^{164/} *Id.* Krieger and Banks, *supra* note 94, at 75; Henley, *The Evolution of Forms of Water Users Organizations in California*, 45 Cal. L. Rev. 665, 673 (1957).

1. Amend existing district acts;
2. Use a joint powers agreement;^{165/} or
3. Form a district under a general district act that authorizes replenishment and pump taxes.

In 1962, the Assembly Interim Committee on Water concluded that:

From the record available to the committee there is no basis to conclude that the formation of a replenishment district is preferable to adding replenishment powers to an existing district, other factors being equal. Where the addition of replenishment powers to an existing district may eliminate the need for creating another district, it would be preferable to use the existing district.^{166/}

All authorities do not agree with this conclusion. One commentator observed that:

The extension of powers of existing agencies to attain full basin management raises several problems. Most existing agencies were created either by vote of the people within them or by the legislature for specific purposes, such as water supply, reclamation, or flood control. To enlarge those powers by legislative fiat would not only confer powers not originally contemplated by the electorate, but in some cases would create a conflict with other agencies with similar powers already occupying the field.^{167/}

The use of joint powers agreements to create an entity with jurisdiction over a manageable portion of a groundwater basin has also been criticized. A major criticism is that a joint power authority can only exercise powers that are common to the member agencies.^{168/} Another major criticism is that

^{165/} Cal. Gov. Code Section 65000 et seq. (West 1966). The Joint Exercise of Powers Act allows public agencies to agree to join together to exercise any powers they each have already. They can agree to contribute funds to the common agency. One of the parties can act for all of the parties or a new entity can be created.

^{166/} Assembly Interim Committee on Water, supra note 151, at 46.

^{167/} Krieger and Banks, supra note 94, at 75.

^{168/} Henley, supra note 164, at 673.

a joint power authority cannot issue bonds for water supply and other related facilities.^{169/} One commentator, after discussing these and other criticisms, concludes nonetheless that:

The Joint Powers Act seems to hold the most immediate promise for institutional progress. Much can be done within the present Act to achieve management goals if only the experimenting will continue....^{170/}

Joint powers agreements have not often been used for basin management programs. One example where a joint powers agreement has been used is the Santa Ana Watershed Project Authority, a joint powers agency created by the Orange County Water District and the Chino Basin, San Bernardino Valley, and Western Municipal Water Districts.^{171/} The Authority is planning a groundwater management project which will entail pumping brackish groundwater into an ocean disposal pipeline in order to improve overall basin groundwater quality.^{172/}

Groundwater basin management agreements have also been made which are not under the joint powers act. For example, the Coachella Valley County Water District and the Desert Water Agency have agreed to cooperate in an integrated management program for the common basin.^{173/} Under the agreement, the parties' importation and replenishment programs are coordinated and a data collection and analysis program is set up.

^{169/} Krieger, Institutional Ingenuity: Legal and Institutional Aspects of Ground Water Management, in Proceedings Eighth Biennial Conference on Ground Water 27 (1971).

^{170/} Id. at 28.

^{171/} "Joint Exercise of Powers Agreement Creating Santa Ana Watershed Project Authority", January 1975.

^{172/} Conversation with Mr. Robert Moore, Executive Director, Santa Ana Watershed Project Authority, June 2, 1977.

^{173/} "Water Management Agreement", July 1, 1976.

b. The Orange County Water District -- Basin Management
Without Adjudication

i. District Powers

The Orange County Water District (OCWD)^{174/} has been a leader in district groundwater management without adjudication. The range of powers and financing provisions in the Orange County Water District Act illustrate what can be involved in a district approach to groundwater management. The OCWD Act is a special district act. It was substantially amended in 1953, to add the power to operate a replenishment program and to impose pump taxes on groundwater extraction in the district. It has been amended several times since 1953, to add additional management powers. OCWD powers include the powers itemized in Section 40-2(6) of the OCWD Act:

6. For the common benefit of said district and for the purpose of replenishing, regulating and protecting the ground water supplies within the district to:

- (a) Store water in underground water basins or reservoirs within or outside of said district;
 - (b) Appropriate and acquire water and water rights within or outside of said district;
 - (c) Purchase and import water into said district;
 - (d) Conserve water within or outside of said district;
 - (e) Buy and to sell water at such rates as shall be determined by the board of directors;
 - (f) Exchange water;
 - (g) Distribute water to persons in exchange for ceasing or reducing ground water extractions;
 - (h) Transport, reclaim, purify, treat, inject, extract, or otherwise manage and control water for the beneficial use of persons or property within the district and to improve and protect the quality of the ground water supplies within the district;
- and

^{174/} Cal. Water Code App. Section 40-1 et seq. (West 1968).

(i) Fix the terms and conditions of any contract under which owners or operators of water-producing facilities within the district may agree to use water from an alternative nontributary source in lieu of ground water, and to such end the district may become a party to such a contract and may pay from district funds such portion of the cost of water from an alternate source as will encourage the purchase and use of the same in lieu of producing ground water, as long as persons or property within the district are directly or indirectly benefited by the resulting replenishment;

(j) Determine in the manner herein provided the amount and percentage of water produced from the ground water supplies within the district to the total amount of water produced within district by all persons and operators, including the total amount of water from supplemental sources; require that persons and operators produce more or less of their total water needs from the ground water within district than the basin production percentage determined by district as provided herein; levy a basin equity assessment on those persons and operators who are required by district to produce, or have in fact produced more water from the ground water within district; and to compensate other such persons and operators who are directed by district to produce less than the basin production percentage from ground water within district....^{175/}

The Act also provides for data collection by requiring the registration of "water producing facilities" and periodic filing of "water production statements."^{176/}

ii. General Financing Provisions

Section 40-2 (12) of the Act adds that the district can "cause assessments and/or charges to be levied as hereinafter provided to accomplish the purposes of this act...."^{177/} The OCWD has the power to levy four different types of assessments: ad valorem taxes on all property owners;^{178/} replenishment assessments ("pump taxes") on all water pumped if the basin is

^{175/} Cal. Water Code App. Section 40-2(6) (West Supp. 1977).

^{176/} Cal. Water Code App. Sections 40-24, 40-29 (West 1968).

^{177/} Cal. Water Code App. Section 40-2(12) (West Supp. 1977).

^{178/} Cal. Water Code App. Section 40-18 (West 1968).

overdrafted;^{179/} a replenishment assessment on all water pumped for all purposes other than irrigation where an additional replenishment assessment is "necessary for the protection of the water supply of the district...";^{180/} and basin equity assessments.^{181/} The OCWD was the first district to levy pump taxes and it withstood a constitutional challenge to that power of taxation.^{182/}

The OCWD Act declares that pump taxes are "in furtherance of district activities in the protection of the water supplies ... which are necessary for the public health, welfare and safety of the people of this state."^{183/} OCWD may levy and assess a pump tax only when it determines that either an annual or accumulated overdraft exists in the basin.^{184/} Pump taxes may be levied on all groundwater producing facilities in the district at a uniform rate per acre foot.^{185/} The pump tax proceeds must be used exclusively:

[T]o acquire water and to construct, purchase, lease or otherwise acquire, and to operate and maintain necessary works, machinery, facilities, canals, conduits, wells, pumping plants, water rights, spreading grounds, lands, rights and privileges to replenish and protect the ground water supplies of said district.^{186/}

The total annual pump tax that is levied may not exceed five dollars and fifty cents per acre foot and the total tax collected may not exceed the amount of money needed to purchase replenishment water to eliminate annual or

^{179/} Cal. Water Code App. Section 40-27 (West Supp. 1977).

^{180/} Cal. Water Code App. Section 40-27.1 (West 1968).

^{181/} Cal. Water Code App. Section 40-31.5 (West Supp. 1977).

^{182/} Orange County Water District v. Farnsworth, 138 Cal. App.2d 578, 292 P.2d 927 (1956).

^{183/} Cal. Water Code App. Section 40-23 (West Supp. 1977).

^{184/} Cal. Water Code App. Section 40-27 (West Supp. 1977).

^{185/} Id.

^{186/} Cal. Water Code App. Section 40-23 (West Supp. 1977).

accumulated overdraft.^{187/} The "additional replenishment assessment" can be imposed on all non-irrigation groundwater production facilities if eight OCWD directors determine that an additional pump tax is "necessary for the protection of the water supply ... and that the amount thereof is reasonable."^{188/}

iii. Basin Equity Assessments

OCWD's "basin equity assessments" and "production requirements and limitations" are also declared in the Act to be "in furtherance of district activities in the protection of water supplies ... which are necessary for the public health, welfare and safety of the people of this state."^{189/}

The function of OCWD's basin equity assessment is similar to the "exchange pool" operated by the watermaster service in the Central and West Basins.^{190/} Both can be used to adjust the relative amounts of ground water and surface water that are used in the basin.

Under the exchange pool system, member pumpers with access to alternate surface water supplies reduce pumping below the amount of their "adjudicated right" so that other pumpers without surface water connections may pump more

^{187/} Cal. Water Code App. Section 40-27 (West Supp. 1977). The five dollar and fifty cents figure may be increased if eight directors agree.

^{188/} Cal. Water Code App. Section 40-27.1 (West 1968).

^{189/} Cal. Water Code App. Section 40-31.5 (West Supp. 1977).

^{190/} California Water Service Co. v. Sidebotham & Son, 224 Cal. App.2d 715, 37 Cal. Rptr. 1 (1964). Central and West Basin Water Replenishment Dist. v. Adams, Civil No. 786656, Cal. Super. Ct., Los Angeles County, October 11, 1965.

than their adjudicated right.^{191/} Pumpers who pump more than their adjudicated right pay the watermaster for the exchange pool water they receive, and he in turn pays the parties who "released" water to the exchange pool.^{192/}

Groundwater rights in the Orange County Basin have not been adjudicated and, unlike the West Basin, each pumper does not have a set "adjudicated right" figure. The OCWD Board of Directors makes a determination of the total amount of groundwater pumping that should be allowed in the basin for each year.

The Board obtains a yearly report on the condition of groundwater supplies in the district, groundwater production, use of supplemental sources,

^{191/} California Water Service Co. v. City of Compton, Civil No. 506806, Cal. Super. Ct., Los Angeles County, August 22, 1961, Part VII. Membership in the exchange pool is voluntary. However, some offers to exchange are mandatory and some are voluntary.

Besides the exchange pool, adjudicated pumping rights can be transferred by sale or lease. All transfers must be reported to the watermaster to be effective. The watermaster keeps a list of all parties who indicate an interest in transferring or obtaining rights (California Department of Water Resources, Bulletin No. 179-75, Watermaster Service in the West Coast Basin 40 (1975)).

^{192/} California Department of Water Resources, Bulletin No. 180-75, Watermaster Service in the Central Basin 47 (1975):

The price is now based primarily on: (a) the type of imported MWD water used by the Exchangors during the preceding fiscal year (July 1 - June 30); (b) the cost of such water, predicated on the average price to be charged by CBMWD during the water year for each type of water; (c) plus \$2 fixed fee; (d) less \$8, which is the estimated average incremental cost of pumping water in the Basin; and (e) less the current replenishment assessment, \$14 in 1974-75. Since item (a) varies among Exchangors and Items (b) and (c) vary from year to year, the cost of Exchange Pool water will likewise vary among Exchangors and from year to year. The Exchangor's Exchange Pool price is averaged to determine the Basinwide price. The 1974-75 price, referred to as the Basinwide Average Exchange Pool Price, was \$45.76.

and the cost of each for the preceding year, and information on the probable availability of supplemental sources for the following year.^{193/} On the basis of this information, and after notice and hearing, the Board may decide to set a "basin production percentage",^{194/} which is a ratio of groundwater to be produced from the basin to the expected total of all water use from groundwater production and supplemental sources.^{195/} The Board may decide to levy a basin equity assessment and to impose a "production requirement or limitation" on district pumpers if "necessary for the protection of the water supply of district."^{196/}

When the OCWD Board sets a basin production percentage for a year, it is setting an amount which it has determined is the maximum amount that should be extracted from the basin for that year. Based on information concerning a pumper's pumping and use of supplemental sources, a pumper's extraction is required to be a certain amount; the ratio of his groundwater pumping to total water use may be either more or less than the basin production percentage for the entire basin. If, for example, a pumper's production requirement is 90 percent (i.e., he must take no more than 90 percent of the water he needs by pumping groundwater) and the basin production percentage is 80 percent (i.e., of the total water use in the basin, groundwater can be used to meet only 80 percent of those needs), the pumper must pay to the district:

[A]n amount determined by the number of acre-feet of water which such person or operator has produced from ground water within the district in excess of the acre-foot equivalent of the basin production percentage multiplied by the applicable basin equity assessment rate.^{197/}

- ^{193/} Cal. Water Code App. Section 40-31.5 (a) (West Supp. 1977).
^{194/} Cal. Water Code App. Section 40-31.5 (c), (d) (West Supp. 1977).
^{195/} Cal. Water Code App. Section 40-31.5 (West Supp. 1977).
^{196/} Cal. Water Code App. Section 40-31.5 (d) (3) (West Supp. 1977).
^{197/} Cal. Water Code App. Section 40-31.5 (f) (West Supp. 1977).

Correspondingly, a pumper whose production is limited to less than the basin production percentage is paid by the district out of the basin equity assessment fund.^{198/} The district must use the proceeds from the basin equity assessments "to equalize the cost of water to all persons and operators within the district."^{199/}

The OCWD can use these financing measures to regulate total groundwater extraction in the basin without having adjudicated groundwater rights. In the OCWD, groundwater pumpers have no cost advantages based on historic use; old pumpers pay at the same rate as new pumpers.^{200/} Only agricultural uses have a price advantage.^{201/} In the adjudicated West Basin, old pumpers are favored: "The recognition of water rights, however, is not in water but in the price paid for water."^{202/}

One commentator concluded, after comparing the Orange County Water District and West Basin experiences:

The important fact appears to be that there was a choice, and each district chose -- or perhaps it would be more accurate to say discovered -- a pattern which proved to be workable and acceptable. The incentives in both instances to unified operation were ... challenges which individual water right owners could not effectively cope with by themselves. Unity was required to achieve a unified management, and in retrospect it does not appear to have been important that one path or the other was followed.^{203/}

^{198/} Id.

^{199/} Cal. Water Code App. Section 40-31.5 (West Supp. 1977).

^{200/} C. Corker, *supra* note 93, at 213. In effect, the gross pump tax eliminates any money value in water rights. In Orange County, water rights are not separately assessed for property tax purposes.

^{201/} E.g., Cal. Water Code App. Section 40-31.5 (d) (West Supp. 1977).

^{202/} C. Corker, *supra* note 93, at 215. *But see* page 53, below.

^{203/} Id.

c. The Central and West Basin Water Replenishment District--
District Management in an Adjudicated Basin

The interrelationship of districts and adjudications in the West and Central Basins of Southern California illustrates another type of district-based management solution that has been developed. In 1945, an adjudication of the West Basin was begun.^{204/} The basin was overdrafted and threatened by permanent damage from salt water intrusion. The trial court referred the matter to the predecessor of the State Water Resources Control Board for a determination of the facts. In 1961, the court issued a judgment based on agreement and stipulation by owners of more than 80 percent of pumping rights. The judgment allocated the groundwater, set up an exchange pool, reserved jurisdiction, and continued court supervision through a watermaster, the Department of Water Resources.^{205/}

The court's order was upheld on appeal.^{206/} The Court of Appeal expressly affirmed the lower court's determination:

[T]here was no necessity for distinguishing between the overlying users and appropriators. The object of the judgment was to relieve the overdraft and prevent salt water intrusion.^{207/}

Supplemental surface water was available to make the court's physical solution, the watermaster-run exchange pool, workable, since the West Basin Municipal Water District^{208/} had joined the Metropolitan Water District of Southern California in 1948.^{209/}

^{204/} California Water Service Co. v. City of Compton, Civil No. 506806, Cal. Super. Ct., Los Angeles County, August 22, 1961.

^{205/} Id.

^{206/} California Water Service Co. v. Sidebotham & Son, 224 Cal. App.2d 715, 37 Cal. Rptr. 1 (1964).

^{207/} Id. at 731, 37 Cal. Rptr. at 10.

^{208/} Organized under Cal. Water Code Section 71000 et seq. (West 1966).

^{209/} Krieger and Banks, supra note 94, at 64, n. 25.

The West Basin is downstream from the Central Basin. Overdraft in the Central Basin aggravated the West Basin's problems.^{210/} The Central Basin Municipal Water District was formed in 1952, and was annexed to the Metropolitan Water District of Southern California in 1954.^{211/} The availability of supplemental surface water did not ease the Central Basin overdraft. One commentator compared the situation in the West Basin to the situation in the Central Basin:

'The West Basin has operated for several years under court approved curtailment of pumping. Only 30 % of the water used in West Basin is supplied by wells, 70% is furnished by the Metropolitan Water District, and this has helped stabilize water levels. Pumping in Central Basin is unrestricted and 83% of the water used there is produced from wells, while only 17% is furnished by Metropolitan.

'There are 37 service connections to The Metropolitan Water District system in Central Basin having a total capacity of 530 second feet. They are seldom used because producers are not willing to reduce pumping in an area where no legal action has been taken to adjudicate water rights. They know that under the decision in the Raymond Basin case, the more water a producer pumps, the greater his right becomes, and that if he reduces his pumping, his water right could be proportionately impaired!^{212/}

In an effort to control Central Basin pumping, the Central and West Basin Water Replenishment District (CWBWRD) was formed in 1959, under the general act.^{213/} The CWBWRD has replenishment and pump tax powers and the CWBWRD boundaries conform to the boundaries of the two basins.

^{210/} Id. at 64.

^{211/} California Department of Water Resources, Bulletin No. 180-75, Water-master Service in the Central Basin 8 (1975).

^{212/} Krieger and Banks, supra note 94, at 64, quoting Fossette, "Protection and Utilization of Ground Water Basins Through Planned Replenishment and Coordinated Operation", a paper presented to the Governor's Dry Year Water Conference, Los Angeles, California, July 13, 1961.

^{213/} Cal. Water Code Section 60000 et seq. (West 1966).

In 1961, the CWBWRD began an adjudication of the Central Basin in order to control pumping there to the same extent as in the West Basin.^{214/} Based on agreement and stipulation by owners of "over 75 percent of the Assumed Relative Rights within the Basin", the court issued an interim order in 1961, which controlled basin pumping and appointed the Department of Water Resources as watermaster.^{215/} The court entered a final judgment in 1965, again pursuant to an agreement and stipulation by the parties, and after only one week of trial.^{216/}

In the West and Central Basins, the court-appointed watermasters cooperate closely with the CWBWRD.^{217/} While the watermaster administers the exchange pools in the two basins based on data it collects cooperatively with CWBWRD, CWBWRD carries on several replenishment and salt water intrusion barrier programs.^{218/}

One program is an "in-lieu replenishment" program in which CWBWRD contracts with pumpers who have access to supplemental water to use that water instead of pumping groundwater.^{219/} CWBWRD can use this program to:

^{214/} Central and West Basin Water Replenishment District v. Adams, Civil No. 786656, Cal. Super. Ct., Los Angeles County, October 11, 1965.

^{215/} California Department of Water Resources, Bulletin No. 180-75, Watermaster Service in the Central Basin 8 (1975).

^{216/} Id. The rights of all parties except the State of California and the City of Los Angeles were determined according to the mutual prescription formula. Los Angeles stipulated that it would abide by the physical solution, but the city's rights were not determined by the formula. Central and West Basin Water Replenishment District v. Adams, Civil No. 786656, Cal. Super. Ct., Los Angeles County, October 11, 1965, at 5.

^{217/} Id. at 10.

^{218/} Id.

^{219/} Cal. Water Code Section 60230 (16) (West Supp. 1977).

Alter pumping patterns within a ground water basin; replenish areas of low transmissibility where conventional recharge techniques are ineffective; heighten the effect of injecting water to form a sea-water barrier by reducing extractions in the vicinity; reduce the amount of replenishment water purchased by CWBWRD; and reduce the annual ground water extraction from a ground water basin.^{220/}

Pumping is not limited to safe yield in either the West or Central Basins.^{221/} The CWBWRD Act provides:

[F]ollowing a final adjudication of all or substantially all of the rights to extract ground water and a determination of the natural safe yield of the ground water supplies within the district, and a determination of the amount or extent to which the rights to extract ground water so adjudicated may be exercised without exceeding the natural safe yield of such ground water supplies, the board of such district shall recognize such judicial determination by exempting from replenishment assessments the amount of water pumped by each person whose rights have been so adjudicated which does not exceed his proportionate share of the natural safe yield....^{222/}

Since safe yield figures have not been set for the basins, the pump tax is a gross pump tax that is applied to all pumping. Use of a gross pump tax lessens the economic advantage of adjudicated rights within the safe yield.

d. Watermaster Management

The concept of using a watermaster as a managing agency, pursuant to a stipulated adjudication, has been considered in several situations. The

^{220/} California Department of Water Resources, Bulletin No. 180-75, Watermaster Service in the Central Basin 19 (1975).

^{221/} The court stated that total basin pumping could be limited to a safe yield figure if that were "required". California Water Service Co. v. Sidebotham & Son, 224 Cal. App.2d 715, 723, 37 Cal. Rptr. 1, 6 (1964). Central and West Basin Water Replenishment Dist. v. Adams, Civil No. 786656, Cal. Super. Ct., Los Angeles County, October 11, 1965.

^{222/} Cal. Water Code Section 60350 (West 1966).

judgment in Upper San Gabriel Valley Municipal Water District v. City of Alhambra (San Gabriel)^{223/} and the stipulation for judgment in Chino Basin Municipal Water District v. City of Chino (Chino Basin)^{224/} illustrate a type of solution that is now being developed.

The watermaster established by the stipulated judgment in the San Gabriel case is composed of nine members appointed by the court, of whom six are nominated by groundwater pumpers and three by the two main water districts in the basin.^{225/} The powers and duties of the San Gabriel watermaster are much more extensive than those of the Department of Water Resources in the West and Central Basins; in those basins, the watermaster primarily has a record-collecting and accounting function.^{226/} In the San Gabriel Basin, the watermaster is a policy maker:

The watermaster is no longer simply an inventory-taking agency, although he does have an inventory function. His most important function now is that of the discretionary management of the basin.... In reality, this nine-man watermaster committee is a 'board of directors' of a semi-political agency created under the auspices of the court in the adjudication proceeding.^{227/}

^{223/} Upper San Gabriel Valley Municipal Water District v. City of Alhambra, Civil No. 924128, Cal. Super. Ct., Los Angeles County, January 4, 1973 [hereinafter cited as San Gabriel Case].

^{224/} Chino Basin Municipal Water District v. City of Chino, Civil No. 164327, Cal. Super. Ct., San Bernardino County, filed January 2, 1975 [hereinafter cited as the Chino Basin Case]. A Stipulation for Judgment, dated February 1, 1977, is currently being circulated to the parties.

^{225/} San Gabriel Case, *supra* note 223, at 14. The Upper San Gabriel Valley Municipal Water District selects two and the San Gabriel Valley Municipal Water District selects one.

^{226/} In the Central and West Basins, the Central and West Basin Water Replenishment District makes many of the same type of management decisions the San Gabriel watermaster makes. In the main San Gabriel Basin there was no single overlying agency such as the Central and West Basin Water Replenishment District.

^{227/} Stark, Developing Institutional and Legal Concepts in Ground Water Management, in Proceedings Eighth Biennial Conference on Ground Water 96 (1971).

The San Gabriel judgment gave the watermaster "broad discretion."^{228/} Perhaps the most significant aspect of the watermaster's discretion is the fact that the watermaster is in charge of determining the "operating safe yield" of the basin each year.^{229/} "Operating safe yield" is different than "natural safe yield."^{230/} Setting the "operating safe yield" figure each year has a significant economic impact on basin pumpers because only water pumped in excess of a pumper's share of the "operating safe yield" is subject to assessment by the watermaster.^{231/}

Additional watermaster powers include the power to levy assessments, to purchase and recharge with supplemental water,^{232/} and the power to control

^{228/} San Gabriel Case, supra note 223, at 23.

^{229/} Id. at 24 ff. The watermaster's safe yield determination is subject to a hearing (Id. at 25) and to the continuing supervision and control of the court (Id. at 17). "Operating safe yield" is defined (Id. at 4) as:

The quantity of water which the Watermaster determines hereunder may be pumped from the Basin in a particular fiscal year, free of the replacement water assessment under the Physical Solution herein.

^{230/} Id. at 4. "Natural safe yield" is defined in the San Gabriel Case as: The quantity of natural water supply which can be extracted annually from the Basin under conditions of long term average annual supply, net of the requirement to meet downstream rights as determined in the Long Beach Case (exclusive of pumped export), and under cultural conditions as of a particular year.

^{231/} Id. at 24.

^{232/} Id. at 18. The Pomona Valley and Upper San Gabriel Valley Municipal Water Districts are member public agencies of the Metropolitan Water District of Southern California. The San Gabriel Valley Municipal Water District has a direct contract for State Water Project water (Id. at 6).

the use of basin storage space through "cyclic storage agreements."^{233/}
The judgment expressly states that the watermaster has "sole custody and control of all ground water storage rights in the Basin pursuant to the Physical Solution herein, and subject to review of the Court."^{234/}

^{233/} Id. at 20:

Cyclic Storage Agreements . To enter into appropriate contracts, to be approved by the Court, for utilization of ground water storage capacity of the Basin for cyclic or regulatory storage of supplemental water by parties and nonparties, for subsequent recovery or Watermaster credit by the storing entity, pursuant to uniform rules and conditions, which shall include provision for: (1) Watermaster control of all spreading or injection and extraction scheduling and procedures for such stored water; (2) calculation by Watermaster of any special costs, damages or burdens resulting from such operations; (3) determination by Watermaster of, and accounting for, all losses in stored water, assuming that such stored water floats on top of the ground water supplies, and accounting for all losses of water which otherwise would have replenished the Basin, with priorities being established as between two or more such contractors giving preference to parties over nonparties; and (4) payment to Watermaster for the benefit of the parties hereto of all special costs, damages or burdens incurred (without any charge, rent, assessment or expense as to parties hereto by reason of the adjudicated proprietary character of said storage rights, nor credit or offset for benefits resulting from such storage); provided, that no party shall have any direct interest in or control over such contracts or the operation thereof by reason of the adjudicated right of such party, the Watermaster having sole custody and control of all ground water storage rights in the Basin pursuant to the Physical Solution herein, and subject to review of the Court.

^{234/} Id. at 21.

Under the stipulation for judgment in the Chino Basin case, the Chino Basin Municipal Water District will be the watermaster.^{235/} The Chino Basin watermaster's powers are similar to the San Gabriel watermaster's, including the power to control the use of basin storage space.^{236/} One substantial difference between the operation of the two management watermasters is that the Chino Basin watermaster is not only subject to review by the court, but is also subject to review by an "Advisory Committee" and "Pool Committees."^{237/}

^{235/} Chino Basin Case, supra note 224, February 1, 1977, Judgment for Stipulation, at 11.

^{236/} Id. at 14. Exhibit "I", at 80, provides:

Ground Water Storage Agreements. Any agreements authorized by Watermaster for storage of supplemental water in the available ground water storage capacity of Chino Basin shall provide:

- (a) The quantities and term of the storage right.
- (b) A statement of the priority or relation of said right, as against overlying or Safe Yield uses, and other storage rights.
- (c) The procedure for establishing delivery rates, schedules and procedures which may include
 - (1) spreading or injection, or
 - (2) in lieu deliveries of supplemental water for direct use.
- (d) The procedures for calculation of losses and annual accounting for water in storage by Watermaster.
- (e) The procedures for establishment and administration of withdrawal schedules, locations and methods.

^{237/} Id. at 16.

Under the stipulation for judgment, the court in the Chino Basin case would enjoin basin pumpers from pumping more than the basin's safe yield^{238/} (which the court sets) "except pursuant to the Physical Solution".^{239/}

Pumping rights would be allocated among three "pools": the "Overlying (Agricultural) Pool"; the "Overlying (Non-Agricultural) Pool"; and the "Appropriative Pool."^{240/} Each pool organizes a pool committee whose main function will be to develop policy recommendations for the administration of the pool.^{241/} The Advisory Committee is made up of representatives from each pool.^{242/}

e. Related Stream System Adjudications

Many of the major groundwater management efforts in Southern California have involved thousands of parties and more than one groundwater basin.

^{238/} Id. at 6. Safe yield is set at 140,000 acre feet per year.

^{239/} Id. at 9. It is stated at 23:

A fundamental premise of the Physical Solution is that all water users dependent upon Chino Basin will be allowed to pump sufficient waters from the Basin to meet their requirements. To the extent that pumping exceeds the share of the Safe Yield assigned to the Overlying Pools, or the Operating Safe Yield in the case of the Appropriative Pool, each pool will provide funds to enable Watermaster to replace such overproduction.

^{240/} Id.

^{241/} Id. at 20.

^{242/} Id. at 16.

Complicated adjudications have been attempted, for example, for the Santa Ana, Mojave, San Gabriel, and Santa Margarita river systems.^{243/}

Streamflow and groundwater supply are interrelated. Outflows from upstream basins become inflow to downstream basins. Adjudicating rights in a downstream basin cannot be fully effective unless the basin's water supply, which includes inflow from the stream, is determined.

Orange County's experience provides an example of the situation where the success of a basin management program depends on whether the stream system of which the basin is a part is adjudicated. One authority noted:

While the Orange County Water District has been content to manage internal affairs within its basin without litigation, it has taken vigorous action to curtail upstream cities from taking more than their fair share of the stream supply. It is this inter-basin conflict that constitutes one of the chief problems in ground water basin management.^{244/}

Orange County is at the lower end of the Santa Ana River. The Orange County Water District has initiated two suits since 1951, to settle the rights of upstream claimants to the river.^{245/} In the first case, the district sued

^{243/} Orange County Water District v. City of Riverside, 173 Cal. App.2d 137, 343 P.2d 450 (1959), 188 Cal. App.2d 566, 258 P.2d 104 (1961); Orange County Water District v. City of Chino, Civil No. 117628, Cal. Super. Ct., Orange County (1969) (Santa Ana River); Mojave Water Agency v. Abbey, Civil Nos. 130759 and 152413, Cal. Super. Ct., San Bernardino County, Dismissed June 7, 1976 (Mojave River); Central Basin Municipal Water District v. Fossette, 235 Cal. App.2d 689, 45 Cal. Rptr. 651 (1965) (San Gabriel River); United States v. Fallbrook Public Utility District, 165 F. Supp. 806 (S.D. Cal. 1958), 193 F. Supp. 342 (S.D. Cal. 1961) (Santa Margarita River).

^{244/} Krieger and Banks, *supra* note 94, at 63.

^{245/} Orange County Water District v. City of Riverside, 173 Cal. App.2d 137, 343 P.2d 450 (1959), 188 Cal. App.2d 566, 258 P.2d 104 (1961), and Orange County Water District v. City of Chino, Civil No. 117628, Cal. Super. Ct. Orange County (1969) [hereinafter cited as Second Santa Ana Case].

only four upstream cities. In the second case, the district initially sought an adjudication of water rights against substantially all of the water users upstream from Orange County.^{246/} However, the District dismissed the suit against all but three upstream municipal water districts^{247/} covering the major upstream basins of the river, on the basis of a stipulation for judgment agreed to by the four districts. The stipulated judgment, approved by the court, imposed a physical solution which obligated the three municipal water districts to provide Santa Ana River water of specified quantity and quality to Orange County.^{248/} The court stated:

[S]uch a physical solution will allow the public agencies and water users within each such major hydrologic subarea to proceed with orderly water resource planning and development.^{249/}

The adjudication was too large successfully to establish all rights on the Santa Ana River. As a result, the adjudication was changed to achieve a different goal, the quantification of gross water supply to basins on the river system. Stream system adjudications generally have either failed or have been simplified, as the Santa Ana adjudication was, to establish gross supply figures.^{250/} When adjudications are simplified, they can successfully break down into manageable units the problem of setting supply figures for each basin.

^{246/} Second Santa Ana Case, supra note 245, at 6.

^{247/} The three were the Chino Basin and San Bernardino Valley Municipal Water Districts and the Western Municipal Water District of Riverside County.

^{248/} Second Santa Ana Case, supra note 245, at 10 ff. The provisions of the judgment are administered by a watermaster composed of five members, two nominated by the Orange County Water District, and one each by the Western, Chino Basin, and San Bernardino Valley Municipal Water Districts (Id. at 15). It is interesting to note that the judgment in this water rights case included water quality limitations.

^{249/} Id. at 7.

^{250/} The Santa Ana and San Gabriel adjudications are examples of cases in which stream system adjudications were successfully modified to set gross basin supply figures. The Mojave River adjudication failed, and the Santa Margarita case did not succeed in establishing either total water supply or individual rights.

f. Management Without Supplemental Surface Supplies

One authority suggests that a source of supplemental water is essential in order to carry out a basin management program.^{251/} It appears that no basin adjudication or comprehensive management program has been undertaken in such areas as the San Joaquin Valley where supplemental surface water is not available or definitely expected to be available.

If a groundwater basin were to be adjudicated in a situation in which supplemental surface water were not available, a decision would have to be made to either restrict pumping to safe yield or to mine the basin. If a decision were made to follow a mining management program, the economic life-span of the dependent communities might be limited. If a safe yield management program were chosen, economic growth of the dependent communities might be limited.

A community may wish to mine its groundwater and develop an economy which may eventually be able to finance a surface water importation project. One commentator noted:

Significant portions of the Central Valley and some smaller areas of Northern California have been subject to rapidly declining groundwater tables at one time or another during the twentieth century. In no substantial case has litigation been employed to stop an overdraft by owners of overlying lands, and the competitive extraction process has been allowed to run. Its main influence has been to encourage the action of large wholesalers (principally the Bureau of Reclamation) to import supplemental surface supplies.^{252/}

This tactic may no longer be viable. The National Water Commission counseled that "Congress should scrutinize closely project proposals for areas mining

^{251/} Krieger and Banks, supra note 94, at 61.

^{252/} Bain, supra note 69, at 454.

ground water that have not instituted conservation regimes and prudent management practices....^{253/}

Rescue projects which are authorized may be limited to ensure that groundwater basins are replenished by requiring that the supplemental water be used to replace the overdrafted groundwater source rather than to merely augment the groundwater supply. A draft version of a bill to amend the Central Valley Project authorization acts would restrict the use of water from the proposed Mid-Valley Canal.^{254/} Water would not be used to increase net water use in the canal service area.^{255/} The bill would provide:

Except for water to be used for fish and wildlife benefits, water from the Mid-Valley Canal shall be used primarily for the purpose of alleviating the ground water overdraft in the canal service area.^{256/}

Contractors who contract for Mid-Valley Canal water would have to be able to demonstrate that that water would be used primarily to alleviate overdraft, or water delivery would be discontinued.^{257/} They would have to be able to show that they could enforce measures to prevent the use of underlying groundwater to irrigate new land within the contractor's service area and that they could prevent appropriation of underlying groundwater for use outside of the contractor's service area.^{258/}

^{253/} United States National Water Commission, Water Policies for the Future 243 (1973).

^{254/} California Department of Water Resources, Draft Bill to Amend the Central Valley Project Authorization Acts, May 19, 1977, Revision. This bill is being prepared by the Department of Water Resources, the State Water Resources Control Board, the United States Bureau of Reclamation, and various interest groups to solve the problems that have arisen as a result of the Bureau of Reclamation's refusal to participate fully in meeting delta water quality standards.

^{255/} Id. at Section 622.

^{256/} Id. at Section 623.

^{257/} Id. at Section 625.

^{258/} Id. at Section 624.

C. Conjunctive Use of Groundwater

1. Definition

The term "conjunctive use" refers both to the storage of water in a groundwater basin and to the coordinated use of surface water when it is available and groundwater when surface water is not available. The coordinated operation aspect of conjunctive use does not involve artificial recharge, but involves, for example, the development of dual irrigation systems:

The surface water supply available to major water agencies on the east side of the San Joaquin Valley varies widely from year to year since it is dependent upon runoff from local perennial streams which range in runoff from as little as 20 percent to as much as 300 percent of the long-term mean. As a consequence of this wide range of surface water availability, the agencies have what may be considered dual irrigation systems. Their conveyance and distribution systems have sufficient capacity to meet most of the applied water demands with surface water during wet years; conversely their ground water pumping capability can meet most of the water demand during dry years.^{259/}

The storage aspect of conjunctive operation of groundwater basins encompasses both storage of surface water in available basin storage space and

^{259/} R. Reynolds, "Statement of the California Department of Water Resources Before the Assembly Water and Agriculture Committees on Ground Water Conditions", Modesto, California, April 15, 1977. Another example of this type of conjunctive use is an in-lieu replenishment program, discussed at page 52 , above.

increasing pumping from basins in order to create storage space.^{260/} A primary purpose of artificially recharging a groundwater basin is to store water in wet years so that an increased amount of water will be in storage for use in drought years.^{261/} Surface water that is used artificially to recharge basins includes water that is appropriated for that purpose,^{262/} flood waters, and water that is imported into a basin.^{263/}

One important benefit of using groundwater basins to store imported water is that the firm yield of an importation project can be increased without having to build economically and environmentally expensive surface storage facilities.^{264/} Evaporation from groundwater basins is much less than from

^{260/} California Department of Water Resources, Bulletin No. 118, California's Ground Water 128 (1975):

The concept [of conjunctive operation] has two basic variations. The first variation, filling empty storage space in advance of use ..., now under consideration for the State Water Project, has had considerable attention. The second possibility is to use and then replace water from a basin that is presently full. Basins which are now largely served by surface supplies are the most promising because of the recharge of the basins from irrigation and conveyance losses. Suitable well and collection facilities would have to be installed to enable water to be taken from the storage in the basin during a dry year, or a period of dry years, and transported to places of use through conveyance facilities such as those of the California State Water Project or the Central Valley Project.

^{261/} Id. at 4.

^{262/} Cal. Water Code Section 1242 (West 1971).

^{263/} Gleason, Water Projects Go Underground, 5 Ecology L.Q. 625, 630 n. 28 (1976).

^{264/} Id. Comprehensive engineering and economic studies are required in evaluating the substitution of basin storage for surface storage, and such studies may indicate that such a substitution is not optimal in every situation.

surface reservoirs.^{265/} An additional advantage of artificial recharge is the use of a basin as a water conveyance and distribution system in lieu of building pipelines.^{266/}

The use of artificial recharge operations to store water underground is not new in California. The flood waters of San Antonio Creek, in Los Angeles County, have been impounded and spread since 1895.^{267/} Conjunctive operation has been declared to be a key part of the State Water Plan since 1957:

Early in the studies concerning The California Water Plan it became apparent that ... control and regulation [of large volumes of water over long climatic cycles] cannot be accomplished by surface storage alone, within foreseen economic limits. It was therefore necessary to examine in detail the feasibility of utilizing the natural storage capacity available in underground basins in order to supplement the available surface storage. Based on such examination, there is every indication that storage capacity, adequate by a relatively safe margin, exists in California's major underground basins to enable the necessary regulation, and that such regulation is physically possible under conservation assumptions.^{268/}

The Department of Water Resources is currently investigating the feasibility of storing State Water Project water in Southern California groundwater basins.^{269/}

2. Two Landmark Cases -- San Fernando and Niles

Two recent landmark opinions by California courts have affirmed that public entities have the right to store water underground and to recapture the stored water: San Fernando and Niles Sand and Gravel Co. v. Alameda County

^{265/} California Department of Water Resources, Bulletin No. 118, California's Ground Water 129 (1975).

^{266/} Gleason, supra note 263, at 627.

^{267/} E. Cooper, Aqueduct Empire 128 (1968).

^{268/} California Department of Water Resources, Bulletin No. 3, The California Water Plan 206 (1957).

^{269/} California Department of Water Resources, Bulletin No. 160-74, The California Water Plan Outlook in 1974, at 97 (1974). Gleason, supra note 263, at 634 n. 46.

Water District (Niles).^{270/} One authority concluded:

Between them, the two decisions have judicially established four public rights that, taken together, represent the general underground storage right and that are of critical importance if California is to realize the full potential of its groundwater basins:

1. The right to store water in a natural underground basin without compensating overlying landowners;
2. The right to protect the stored water from expropriation by others and from inequitable operational burdens;
3. The right to recapture the stored water when it is needed; and
4. The public's priority to store water underground when there is a shortage of underground storage space.^{271/}

3. The Niles Case

In the Niles case, the Court of Appeal enjoined the Niles Sand and Gravel Company from pumping water from its gravel pits and allowing it to flow into San Francisco Bay, and it denied the gravel company's inverse condemnation claim.^{272/} Since 1935, the Alameda County Water District has conducted a groundwater replenishment program in order to prevent salt water intrusion, conserve local surface runoff, and regulate imported water supplies.^{273/} Water from the district's recharge operations seeped into the gravel company's pits and the company pumped the water from the pits and let it waste into the bay:

^{270/} Niles Sand and Gravel Co. v. Alameda County Water District, 37 Cal. App.3d 924, 112 Cal. Rptr. 846 (1974), cert. denied, 419 U. S. 869 (1975) [hereinafter cited as the Niles Case.]

^{271/} Gleason, supra note 263, at 667. However, the fourth item is stated less forcefully at page 665:

Although neither Niles nor San Fernando deal directly with underground storage priorities, each seems to imply that overlying water agencies have a prior right to store enough water underground to assure an adequate annual water supply for the overlying community.

^{272/} Niles Case, 37 Cal. App.3d 924, 932, 112 Cal Rptr. 846, 852 (1974).

^{273/} Id. at 930, 112 Cal. Rptr. at 850. Cal. Water Code Section 30000 et seq., 1961 Cal. Stats. 4092, ch. 1942.

[T]he district and appellants were working at complete cross-purposes: as the district was replenishing the water in the Niles basin, appellants were draining it.^{274/}
The court in Niles agreed with the trial court that, under the correla-

tive rights doctrine, overlying owners in the Niles Basin must "refrain from discharging more than their reasonable share of the underground water...."^{275/}
The gravel company's pumping and discharge was unreasonable because it was detrimental to the "'water basin and the restorative program of the ... district'".^{276/}

The court described the obligation imposed by the correlative rights doctrine as a "servitude".^{277/} This servitude was a "public servitude", "because the right to enforce it is held by a public agency (respondent district) as trustee for all surface owners and suppliers of water (i.e., the 'public') in the Niles Basin."^{278/} Although the court explicitly stated that no "new property interest" had been created for the district's benefit,^{279/} one commentator concluded that Niles had expanded the correlative rights doctrine:

Niles extended Katz by establishing an underground storage right based on the existence of a public servitude for groundwater and groundwater conservation purposes. A property owner's right to use the ground beneath his land does not now include, and apparently has not included for the past seventy years, the right to use the underground in a manner that would impair a public groundwater storage program.^{280/}

^{274/} Niles Case, 37 Cal. App.3d 924, 929, 112 Cal. Rptr. 846, 849 (1974).

^{275/} Id. at 934, 112 Cal. Rptr. at 853.

^{276/} Id.

^{277/} Id.

^{278/} Id. at 935, 112 Cal. Rptr. at 853. The court cites its footnote 5, which includes the statement:

It is also undisputed that the district owns the ground water in the Niles Basin as trustee for all the overlying surface owners located within its boundaries.

^{279/} Id. at 935, 112 Cal. Rptr. at 853.

^{280/} Gleason, supra note 263, at 655.

Niles also established that a public agency does not have to compensate overlying owners for damage from seepage caused by raised groundwater levels,^{281/} up to the point where the recharge operation returns the water table to its "state of nature" level.^{282/} The elevation of a groundwater table is in a "state of nature" when it is in "that condition which would have existed without diversion from the watershed and/or extractions from the basin...."^{283/} The court held that the district's groundwater recharge activities are an exercise of its police powers,^{284/} and that even if overlying owners were damaged by subsurface flooding caused by the district's recharge program, the damage would not be "constitutionally compensable".^{285/}

4. The Effect of Los Angeles v. San Fernando on Conjunctive Use

a. Rights to Native and Imported Water

The enormous importance of San Fernando for the doctrine of mutual prescription has been noted above. Another equally important facet of this case concerns the conjunctive use of groundwater basins.

^{281/} Niles Case, 37 Cal. App.3d 924, 935, 112 Cal. Rptr. 846, 854 (1974).

^{282/} Id. at 929, 112 Cal. Rptr. at 849.

^{283/} Id. Gleason, supra note 263, at 660 states:

Niles recognized that overlying property owners have compensable rights for seepage damage to surface and near surface lands and structures which are caused by raising groundwater levels above 'natural' elevations....

Gleason adds:

The state of nature limit ... may require additional clarification for swamp lands that have been drained and have thus become useable as a result of accumulated groundwater overdrafts.

^{284/} Niles Case, 37 Cal. App.3d 924, 937, 112 Cal. Rptr. 846, 855 (1974).

^{285/} Id. at 936, 112 Cal. Rptr. at 854.

Two types of groundwater were involved: "native" groundwater and "imported" groundwater.^{286/} Native groundwater is replenished by precipitation within the watershed. Imported groundwater includes water imported from outside the watershed, both that which reaches the groundwater basin directly through spreading operations and that which is delivered to customers and later indirectly reaches the basin.^{287/}

Los Angeles asserted a pueblo right to all the native groundwater and surface water of the Upper Los Angeles River Area.^{288/} The court held Los Angeles' pueblo right attaches to native groundwater within the San Fernando Basin and to surface water tributary to that basin, but not to groundwater in the hydrologically independent Sylmar and Verdugo Basins.^{289/} Los Angeles' pueblo right has the highest priority category, equal to the priority of its right to imported water.^{290/}

^{286/} Los Angeles v. San Fernando, 14 Cal. 3d 199, 210, 537 P.2d 1250, 1260, 123 Cal. Rptr. 1, 11 (1975).

^{287/} Id.

^{288/} Id. at 247, 537 P.2d at 1285, 123 Cal. Rptr. at 36. Pueblo rights are defined by W. Hutchins, *supra* note 20, at 256:

The pueblo water right ... is the paramount right of an American city as successor of a Spanish or Mexican pueblo (municipality) to the use of water naturally occurring within the old pueblo limits for the use of the inhabitants of the city.

A pueblo water right has been adjudicated for only Los Angeles and San Diego. A pueblo right is not for a set quantity of water. The San Fernando court stated (14 Cal. 3d 199, 252, 537 P.2d 1250, 1289, 123 Cal. Rptr. 1, 40 (1975)):

The pueblo right gives the city holding it a paramount claim to particular waters only to the extent that they are required for satisfying its municipal needs and those of its inhabitants. 'It thus insures a water supply for an expanding city [citation] with a minimum of waste by leaving the water accessible to others until such time as the city needs it.' (*City of Los Angeles v. City of Glendale...*) (*Italics added.*)

^{289/} Los Angeles v. San Fernando, 14 Cal. 3d 199, 251, 537 P.2d 1250, 1288, 123 Cal. Rptr. 1, 39 (1975).

^{290/} Id. at 287, 537 P.2d at 1314, 123 Cal. Rptr. at 65.

Los Angeles also asserted a right to all imported groundwater, whether spread or delivered. The court held that an importer has the right to recapture from a basin imported water that was added to the groundwater supply of a basin as a result of spreading operations or percolation of return flows attributable to delivered imported water.^{291/} The importer's right to imported groundwater was held to be of the highest priority category, equal to the priority accorded pueblo groundwater rights.^{292/}

These holdings reaffirmed the court's holdings in the 1943 City of Los Angeles v. City of Glendale (Glendale) case.^{293/} The court in Glendale had recognized Los Angeles' pueblo right,^{294/} Los Angeles' right to recapture spread imported water,^{295/} and Los Angeles' right to recapture delivered imported water that had percolated into the ground after being used.^{296/}

b. The Right to Use Storage Space

One commentator has stated that the most important groundwater storage "ruling" in the San Fernando case is probably that groundwater basins should be used instead of surface reservoirs to store water "whenever practicable."^{297/}

^{291/} Id. at 286, 537 P.2d at 1313, 123 Cal. Rptr. at 64.

^{292/} Id. at 287, 537 P.2d at 1314, 123 Cal. Rptr. at 65.

^{293/} City of Los Angeles v. City of Glendale, 23 Cal.2d 68, 142 P.2d 289 (1943) [hereinafter cited as Los Angeles v. Glendale].

^{294/} Id. at 73, 142 P.2d at 292.

^{295/} Id. at 76, 142 P.2d at 294.

^{296/} Id.

^{297/} Gleason, supra note 263, at 639. Gleason qualifies this statement by citing an earlier footnote which states (at 627 n. 9):

However, underground storage does involve some penalties, such as loss of energy due to the need to pump stored water out of the underground basins, and the degradation of the quality of the stored water if the local groundwater is of lower quality.

The court based the right to use a groundwater basin to store and transport water on Water Code Section 7075,^{298/} which declares:

Section 7075. Water which has been appropriated may be turned into the channel of another stream, mingled with its water, and then reclaimed; but in reclaiming it the water already appropriated by another shall not be diminished.^{299/}

The Glendale court had used the same rationale, stating:

It would be as harsh to compel plaintiff to build reservoirs when natural ones were available as to compel the construction of an artificial ditch beside a stream bed.^{300/}

Water Code Section 7075 implicitly provides that natural channels and basins can be used only when excess capacity is available. San Fernando may require, therefore, that the storage of water underground must not interfere with a basin's groundwater supply.^{301/}

San Fernando did not establish a priority system for the use of groundwater basin storage space.^{302/} The trial court had found that artificial recharge operations affect groundwater in storage, groundwater basin storage capacity, groundwater movement, and groundwater levels, and, as a result, had enjoined the spreading of imported water and reserved jurisdiction to consider the terms on which recharge would be allowed.^{303/} The trial court felt

^{298/} Los Angeles v. San Fernando, 14 Cal.3d 199, 260, 537 P.2d 1250, 1295, 123 Cal. Rptr. 1, 46 (1975).

^{299/} Cal. Water Code Section 7075 (West 1971).

^{300/} Los Angeles v. Glendale, 23 Cal.2d 68, 77, 142 P.2d 289, 294 (1943).

^{301/} Gleason, *supra* note 263, at 665.

^{302/} Id. at 642. Gleason states that since the court retained jurisdiction in San Fernando, it could develop storage priority rules for the basin if storage shortages occurred.

^{303/} Los Angeles v. San Fernando, 14 Cal.3d 199, 264, 537 P.2d 1250, 1297, 123 Cal. Rptr. 1, 48 (1975).

that such control of recharge operations was necessary and that the court should apportion the use of storage space to protect the public interest.^{304/}

The San Fernando court rejected the trial court's "anti-spreading provision."^{305/} It held that Los Angeles has a right to use the San Fernando Basin to temporarily store its water.^{306/} The court found:

No necessity is shown for interfering with this right to use the basin for storage, for there does not appear to be any shortage of underground storage space in relation to the demand therefor.^{307/}

The court appears to have agreed with Los Angeles' contention:

[T]he days of high water tables and limited underground storage space are over and that the injunction erects procedural barriers around a beneficial conservation practice.^{308/}

c. The Right to Recapture Imported Water

San Fernando established that the right to recapture imported water has the highest priority category: imported recapture rights and pueblo rights are equally paramount to rights based on overlying use and appropriative groundwater rights.^{309/}

The court stated:

The purpose of giving the right to recapture returns from delivered imported water priority over overlying rights and rights based on appropriations of the native ground supply is to credit the importer with the fruits of his expenditures and endeavors in bringing into the basin water that would not otherwise be there.^{310/}

^{304/} Id. at 224, 537 P.2d at 1269, 123 Cal. Rptr. at 20.

^{305/} Id. at 224 n.14, 537 P.2d at 1269 n.14, 123 Cal. Rptr. at 20 n.14.

^{306/} Id. at 264, 537 P.2d at 1297, 123 Cal. Rptr. at 48.

^{307/} Id.

^{308/} Id. at 224 n.14, 537 P.2d at 1269 n.14, 123 Cal. Rptr. at 20 n.14.

^{309/} Id. at 287, 537 P.2d at 1314, 123 Cal. Rptr. at 65.

^{310/} Id. at 261, 537 P.2d at 1295, 123 Cal. Rptr. at 46.

The defendants in San Fernando had argued that importers should not have a recapture right because they could not trace extractions to deliveries.^{311/} The court rejected this argument and held that the recapture right is an "undivided right" to a quantity of groundwater equal to the amount of imported water which percolated into the groundwater basin and augmented the basin supply.^{312/}

The San Fernando court returned to the rationale used in the Glendale case in discussing whether an importer should have to prove an intent to recapture spread or delivered water which recharged the groundwater basin supply. There were two bases for the holding in Glendale establishing Los Angeles' imported water recapture right.^{313/} The Glendale court had found that Los Angeles had not abandoned the water it imported.^{314/} Implicit in this finding is the determination that Los Angeles intended to recapture the spread and delivered water; Los Angeles had not abandoned the imported water but had planned and located its facilities "to facilitate the availability and recapture" of its imported water.^{315/}

San Fernando focused on the second basis of the recapture right outlined in Glendale which did not require a finding that the importer had an intent to recapture the imported water before importation began.^{316/} Both cases cited Stevens v. Oakdale Irrigation District which held that the district had the right to recapture the water it imported, before the water left the

^{311/} Id. at 260, 537 P.2d at 1294, 123 Cal. Rptr. at 45.

^{312/} Id. at 260, 537 P.2d at 1295, 123 Cal. Rptr. at 46.

^{313/} Id. at 257, 537 P.2d at 1292, 123 Cal. Rptr. at 43.

^{314/} Los Angeles v. Glendale, 23 Cal.2d 68, 76, 142 P.2d 289, 294 (1943).

^{315/} Los Angeles v. San Fernando, 14 Cal.3d 199, 257, 537 P.2d 1250, 1292, 123 Cal. Rptr. 1, 43 (1975).

^{316/} Id. at 259, 537 P.2d at 1294, 123 Cal. Rptr. at 45.

district boundary.^{317/} Glendale applied the Stevens concept of having control over water to water within a groundwater basin:

Once within the basin, en route to plaintiff's diversion works, it was in effect within plaintiff's reservoir.^{318/}

In San Fernando, the spreading, delivery, and extraction of imported water were all within the city's control and, therefore, within the city's "reservoir."^{319/} A recapture right was established without having to show that there was an intent to recapture before importation began.

d. The Right to Prevent Others From Taking Stored Imported Water

San Fernando established that an importer has a right to prevent others from pumping the imported water that reaches the groundwater basin. An importer can have pumping by overlying owners and appropriators enjoined when their pumping plus the importers' extraction of imported water overdrafts the basin.^{320/} The court indicated that an importer, even one who has no rights to native groundwater in a basin, has a right to have total basin extractions limited to the basin's safe yield:

The exercise of the return flow right would become more difficult and eventually impossible if the basin levels were continually lowered by an excess of extractions over safe yield.^{321/}

^{317/} Stevens v. Oakdale Irrigation District, 13 Cal. 2d 343, 90 P.2d 58 (1939).

^{318/} Los Angeles v. Glendale, 23 Cal. 2d 68, 78, 142 P.2d 289, 295 (1943).

^{319/} Los Angeles v. San Fernando, 14 Cal. 3d 199, 259, 537 P.2d 1250, 1294, 123 Cal. Rptr. 1, 45 (1975).

^{320/} Id. at 291, 537 P.2d at 1317, 123 Cal. Rptr. at 68.

^{321/} Id. at 288, 537 P.2d at 1315, 123 Cal. Rptr. at 66.

In order to determine whether other pumpers are taking imported water, importers must obtain information on the safe yield of a basin, who is pumping water, and how much water is being pumped. An importer may have to adjudicate a basin in order to protect his imported water recapture rights, a process which has generally been very expensive and lengthy.^{322/}

The court in San Fernando limited to some extent the rights of an importer to prevent others from taking stored water. Imported water that reaches the groundwater and is not recaptured by the importer can be appropriated by basin pumpers during periods of basin surplus.^{323/} An importer cannot obtain an injunction against extractions that have no effect on the available supply.^{324/} However, even if extractions do have an effect on an importer's paramount rights, an injunction may not be granted:

If extractions which affect plaintiff's rights nevertheless preserve water for beneficial use that would otherwise go to waste, the trial court should endeavor to arrive at a physical solution which would avoid such waste.^{325/}

Although the court noted that the "usual purpose" of a physical solution is to avoid waste of water,^{326/} it suggested that the trial court, in "adjudicating a new accommodation" of water rights in the San Fernando Basin on remand, should consider a physical solution even though there was no evidence that limiting the defendants' pumping in that basin would result in any waste of water:

^{322/} A. Jorgensen, A New Approach to Solving Water Disputes: The Long Beach Case 123 (January 1967) (Master's Thesis, University of Southern California).

^{323/} Los Angeles v. San Fernando, 14 Cal.3d 199, 293, 537 P.2d 1250, 1318, 123 Cal. Rptr. 1, 69 (1975).

^{324/} Id. at 291, 537 P.2d at 1317, 123 Cal. Rptr. at 68.

^{325/} Id.

^{326/} Id. at 290, 537 P.2d at 1316, 123 Cal. Rptr. at 67.

[B]oth defendant cities have made substantial investments in ground water extraction and distribution facilities [citation], and it is possible that a strict limitation on their extractions and their consequent increased dependence on imported water would require large expenditures for new and different facilities. It is also possible that a physical solution might avoid the necessity for some or all of these expenditures without imposing any substantial burden on plaintiff.^{327/}

5. Unanswered Questions

San Fernando and Niles have provided a basis for conjunctive use of groundwater basins. However, there are questions that have not been answered. One authority listed the questions that one group of experts felt remained unanswered after San Fernando:

It was pointed out that the San Fernando Basin is within the boundaries of the cities whose rights were adjudicated, and the question was raised whether a public agency would have the same rights in a basin outside its boundaries. What if two agencies had concurrent jurisdiction over the same area? If a basin which has been recharged by ground water spills, who is entitled to the spill? Does an importer of water have a duty not to cause spill? What is the liability for incremental costs to water right owners resulting from operation and management of a basin? How would conflicting claims to storage space be settled? What rules cover changes in water quality as the result of importation of water or drawdown of water in a basin? Should definitions of such terms as overdraft, safe yield, and temporary surplus be reexamined, and should they be the same for all basins? Could an action be brought to establish rights and liabilities in connection with future use of a basin for storage of water? How can the boundaries of basins be legally established? Who owns mined water? Are mutual water companies subject to prescription? Does the doctrine of 'relation back' apply to public appropriations of ground water? Under what conditions may a basin be used for water reclamation?^{328/}

^{327/} Id.

^{328/} G. Craig, "Report of the Committee Meeting on December 19, 1975", California State Water Resources Control Board Water Rights Advisory Committee.

D. State Constitutional and Statutory Provisions Affecting Groundwater

1. Public Interest in Groundwater Resources

The Water Code explicitly declares that the people of California have an interest in the use and development of California's groundwater resources:

Section 104. It is hereby declared that the people of the State have a paramount interest in the use of all the water of the State and that the State shall determine what water of the State, surface and underground, can be converted to public use or controlled for public protection.

Section 105. It is hereby declared that the protection of the public interest in the development of the water resources of the State is of vital concern to the people of the State and that the State shall determine in what way the water of the State, both surface and underground, should be developed for the greatest public benefit.^{329/}

The Legislature has also clearly stated that there is a public interest in protecting groundwater basins:

Section 12922. It is hereby declared that the people of the State have a primary interest in the correction and prevention of irreparable damage to, or impaired use of, the ground water basins of this State caused by critical conditions of overdraft, depletion, sea water intrusion or degraded water quality.^{330/}

The Constitutional Amendment of 1928, which prohibits the waste or unreasonable use, method of use, or method of diversion of water, applies to groundwater although groundwater is not specifically mentioned.^{331/} The 1928 Amendment did not change existing groundwater law, but it did strengthen it. The 1928 Amendment reinforced the correlative rights principle that overlying

^{329/} Cal. Water Code Sections 104, 105 (West 1971).

^{330/} Cal. Water Code Section 12922 (West 1971).

^{331/} Calif. Const. art. 10, sec. 2. Peabody v. Vallejo, 2 Cal.2d 351, 372, 40 P.2d 486, 498 (1935).

owners can use only the amount of groundwater that is reasonably necessary for overlying uses and any surplus water can be appropriated for non-overlying uses.^{332/}

2. Sources of Groundwater Data

a. Water Wells

Since 1949, Water Code Section 231 has required the Department of Water Resources (Department) to formulate recommendations for standards for water well construction and abandonment after investigating:

[C]onditions of damage to quality of underground waters, which conditions are or may be caused by improperly constructed, abandoned or defective wells through the interconnection of strata or the introduction of surface waters into underground waters.^{333/}

Section 231 requires the Department to report its recommendations for particular localities to Regional Water Quality Control Boards (Regional Boards).^{334/}

In 1967, the Legislature authorized the State to adopt well standards for the protection of groundwater quality in areas where cities and counties failed to act.^{335/} The Department reports to the appropriate Regional Board and to the Department of Health when it finds that well construction, maintenance, abandonment, and destruction standards are needed in an area to protect water quality, and it recommends standards for the particular area.^{336/} If, after holding a hearing, a Regional Board finds that well standards are

^{332/} Peabody v. Vallejo, 2 Cal.2d 351, 372, 40 P.2d 486, 498 (1935).

^{333/} Cal. Water Code Section 231 (West 1971).

^{334/} Id.

^{335/} Cal. Water Code Sections 13800-13806 (West 1971). These sections also pertain to cathodic protection wells.

^{336/} Cal. Water Code Section 13800 (West 1971).

needed in an area, it reports its findings and the standards recommended by the Department to every affected city and county in the area.^{337/}

Affected cities and counties must adopt ordinances establishing standards for well construction, maintenance, abandonment, and destruction within 120 days.^{338/} The Regional Board may review the local ordinances.^{339/}

If the local city or county does not adopt a well standard ordinance which the Regional Board determines is adequate, the Regional Board may adopt standards for the area,^{340/} and the local city or county must enforce the Regional Board's standards.^{341/} The State Water Resources Control Board can review local or Regional Board ordinances.^{342/} Most counties in California have now adopted water well standards.^{343/}

Whenever a person intends to dig, bore, drill, deepen, reperform, abandon, or destroy a well, he must first file a notice of intent with the Department of Water Resources.^{344/} A report of completion must be filed within 30 days after construction or alteration is completed.^{345/} The completion report must contain detailed information, including a well log and perforation and sealing information.^{346/} Access to these reports is limited:

^{337/} Cal. Water Code Sections 13801, 13802 (West 1971). The Regional Board may hold a hearing on well standards on its own initiative.

^{338/} Cal. Water Code Sections 13803, 13804 (West 1971).

^{339/} Cal. Water Code Section 13804 (West 1971).

^{340/} Cal. Water Code Section 13805 (West 1971).

^{341/} Id.

^{342/} Cal. Water Code Section 13806 (West 1971).

^{343/} California Department of Water Resources, "Status of County Ordinances Concerning Well Construction and Destruction in California" (December 1976).

^{344/} Cal. Water Code Section 13750 (West 1971).

^{345/} Cal. Water Code Section 13751 (West 1971).

^{346/} Id.

Section 13752. Reports made pursuant to Section 13751 shall not be made available for inspection by the public but shall be made available to governmental agencies for use in making studies; provided, that any report shall be made available to any person who obtains a written authorization from the owner of the well.^{347/}

b. Porter-Dolwig Ground Water Basin Protection Law^{348/}

In 1961, the Legislature found:

[T]he greater portion of the water used in this State is stored, regulated, distributed, and furnished by its ground water basins, and that such basins are subject to critical conditions of overdraft, depletion, sea water intrusion and degraded water quality causing great detriment to peace, health, safety and welfare of the people of the State.^{349/}

The Legislature declared that the State's policy is to prevent irreparable damage to and correct impaired use of groundwater.^{350/} The Department of Water Resources was authorized to conduct investigations and studies of projects that could protect groundwater.^{351/} The Department was required to transmit its results to the State Water Resources Control Board and the Regional Water Quality Control Boards so that the Department's studies could be considered in the water quality control planning process.^{352/}

The Department was directed to carry out its studies under the Porter-Dolwig Ground Water Basin Protection Law "whenever money has been appropriated for the purpose...."^{353/} The Legislature repealed the law's financing provisions in 1967,^{354/} but similar studies have continued to be conducted under other programs.

^{347/} Cal. Water Code Section 13752 (West 1971). Assemblyman Gualco introduced AB 1438 on April 7, 1977, which would require persons who file a Section 13750 notice of intent to publish such notice in a general circulation newspaper in the vicinity of the well site.

^{348/} Cal. Water Code Section 12920 et seq. (West 1971).

^{349/} Cal. Water Code Section 12922.1 (West 1971).

^{350/} Cal. Water Code Section 12922 (West 1971).

^{351/} Cal. Water Code Section 12923 (West 1971).

^{352/} Cal. Water Code Section 12923.1 (West 1971).

^{353/} Cal. Water Code Section 12923 (West 1971).

^{354/} 1967 Cal. Stats. 970, ch. 70, sec. 2.

c. Porter-Cologne Water Quality Control Act^{355/}

The Porter-Cologne Act establishes a statewide program for water quality control that is administered on a regional basis.^{356/} "Waters of the State" is defined to include groundwater as well as surface water.^{357/} Regional Water Quality Control Boards are required to establish "water quality objectives" in their water quality control plans.^{358/} They have established objectives for groundwater and have taken into account in their implementation plans the effects of point and non-point sources on groundwater.^{359/}

Regional Boards are developing groundwater surveillance and monitoring programs which include groundwater "networks." All regional boards have designated "principal aquifers."^{360/} A regional board program generally includes designation of principal aquifers in a region, selection of wells to be included in the groundwater network, and identification of potential sources of pollution.^{361/}

d. The Recordation Act^{362/}

The Recordation Act applies to groundwater pumpers in Riverside, San Bernardino, Los Angeles, and Ventura counties.^{363/} The Legislature found that only those counties should be included, because of the combination of light

^{355/} Cal. Water Code Section 13000 et seq. (West 1971 and West Supp. 1977).

^{356/} Cal. Water Code Section 13000 (West 1971).

^{357/} Cal. Water Code Section 13050(e) (West 1971).

^{358/} Cal. Water Code Sections 13240, 13241 (West 1971).

^{359/} E.g., California State Water Resources Control Board, Central Coast Region (3), Water Quality Control Plan Report, Central Coastal Basin 5-40 (1975), and California State Water Resources Control Board, Central Valley Region (5-D), Water Quality Control Plan Report, Tulare Lake Basin I-5-1 ff. (1975).

^{360/} California State Water Resources Control Board, Division of Planning and Research, "Principal Aquifers of California" (1975).

^{361/} State Water Resources Control Board, Central Coast Region (3), Water Quality Control Plan Report, Central Coastal Basin 7 (1975).

^{362/} Cal. Water Code Section 4999 et seq. (West 1971).

^{363/} Cal. Water Code Section 5000(c) (West 1971).

rainfall, concentrated population, agricultural to urban transition, and dependence on generally overdrawn groundwater supplies there.^{364/}

Pumpers in those counties must file "Notices of Extraction and Diversion of Water" with the State Water Resources Control Board (Board) each year.^{365/} Notices include such information as the location of wells and the amount of water pumped.^{366/} Any person may ask the Board to investigate the facts stated in a notice and to issue a written determination of facts.^{367/} In any action or proceeding, a determination by the Board is prima facie evidence of the facts, whereas a notice of extraction, without a Board investigation and determination, cannot be used as evidence of the facts stated.^{368/} Failure to file a notice results in no prescriptive rights to groundwater accruing for that year and is equivalent to nonuse of the water for that year.^{369/}

There have been several unsuccessful efforts to expand the recordation requirements. In 1972, Assemblyman Porter introduced a bill which would have authorized the Board to identify "threatened groundwater basin[s] subject to a critical condition of overdraft"; those basins would have been subject to the Recordation Act.^{370/}

^{364/} Cal. Water Code Section 4999 (West 1971).

^{365/} Cal. Water Code Section 5001 (West 1971). There are several exceptions from the filing requirement.

^{366/} Cal. Water Code Section 5002 (West 1971).

^{367/} Cal. Water Code Section 5007 (West 1971). The person must pay for the investigation.

^{368/} Id.

^{369/} Cal. Water Code Sections 5003, 5004 (West 1971). Parties to an adjudication can agree not to impose these sanctions on those who failed to file annual notices.

^{370/} Assembly Bill 737 (1972 Legislative Session).

e. Other Sources of Groundwater Data

Several state-level sources of groundwater data, such as court references, are considered separately below. Many federal and local governmental entities also collect groundwater data and carry on groundwater investigations and studies. The United States Geological Survey and the Bureau of Reclamation have done extensive work.^{371/} The Environmental Protection Agency is developing an "Underground Injection Control Program" under the Safe Drinking Water Act^{372/} which may involve the collection of a significant amount of groundwater data.

At least one county has a permit requirement for some groundwater pumping.^{373/} Imperial County requires all "appropriators" of groundwater to obtain a permit.^{374/} An "appropriator" is identified as anyone who pumps groundwater in order to use it or sell it outside of the area in which pumping affects the natural available water supply.^{375/} The Imperial County Board of Supervisors' declared intent is that "the right to appropriate water ... be denied or limited where there is substantial evidence of overdraft."^{376/} Permit

^{371/} California Department of Water Resources, Bulletin No. 118, California's Ground Water 103 ff. (1975).

^{372/} Safe Drinking Water Act, Pub. L. No. 93-523, 88 Stat. 1660 (1974).

^{373/} County of Imperial, Ground Water Appropriation Ordinance, Section 56200 et seq. The town of Fairfax, California, is also considering a groundwater permit ordinance, Proposed Ordinance No. 428 (1977).

^{374/} County of Imperial, Ordinance Section 56202. This ordinance is the subject of a lawsuit, County of Imperial v. Douglas C. McDougal, Civil No. 30681, Cal. Super. Ct., Los Angeles County. That case was argued before the California Supreme Court on March 2, 1977, on other issues.

^{375/} County of Imperial, Ordinance Section 56201.

^{376/} County of Imperial, Ordinance Section 56200.

applicants may be required to provide information concerning well location, the amount of water to be appropriated, and any requested hydrological data.^{377/}

Water management organizations also compile a substantial amount of ground-water data. For example, the Orange County Water District requires that all groundwater producing facilities be registered with the district.^{378/} Operators of those facilities must file "water production statements" twice each year that report total groundwater production in acre feet.^{379/} In addition, the district conducts annual investigations of groundwater conditions in the district.^{380/}

3. Court References in Groundwater Cases

In a lawsuit involving groundwater rights, a court may order a reference to the State Water Resources Control Board (Board) concerning the issues involved in the lawsuit,^{381/} or may ask the Board to investigate and report on the physical facts that are involved.^{382/} The Board's report is prima facie evidence of the physical facts reported.^{383/} The Board's expenses in acting as the court's referee are apportioned to the parties.^{384/}

In one narrow set of circumstances, the Board may apply to the court for a preliminary injunction equitably restricting and apportioning pumping in a

^{377/} County of Imperial, Ordinance Section 56203.

^{378/} Cal. Water Code App. Section 40-24 (West 1966).

^{379/} Cal. Water Code App. Section 40-29 (West 1966).

^{380/} Cal. Water Code App. Section 40-25 (West 1966).

^{381/} Cal. Water Code Section 2000 (West 1971).

^{382/} Cal. Water Code Section 2001 (West 1971).

^{383/} Cal. Water Code Section 2019 (West 1971).

^{384/} Cal. Water Code Section 2043 (West 1971).

basin, after it has filed its report.^{385/} The Board may act only in such basin adjudications in Santa Barbara, Ventura, Los Angeles, Orange, and San Diego counties where continued unrestricted groundwater pumping would destroy or irreparably harm the groundwater in a basin because of ocean water intrusion.^{386/}

4. Adjudications to Protect the Quality of Groundwater

Following a recommendation from the Department of Water Resources or as a result of an investigation by any governmental agency, the State Water Resources Control Board may:

[F]ile an action in the superior court to restrict pumping, or to impose physical solutions, or both, to the extent necessary to prevent destruction of or irreparable injury to the quality of such water.^{387/}

Before it may file such an action, the Board must hold a public hearing. If the Board decides that a basin adjudication is necessary, it must allow any local public agency 90 days to commence the action. If no local agency acts, the Board may initiate the adjudication.^{388/} The Board has never exercised its power under these adjudication provisions.

5. Water Code Sections 1005.1 - 1005.4^{389/}

Water Code Section 1005.1 provides that a groundwater pumper^{390/} who reduces or stops his groundwater pumping because he is using an alternate

^{385/} Cal. Water Code Section 2020 (West 1971). A bond is not required.

^{386/} Id.

^{387/} Cal. Water Code Section 2100 (West 1971).

^{388/} Cal. Water Code Section 2101 (West 1971).

^{389/} Cal. Water Code Section 1005.3 (West 1971) applies only to basins within the Tehachapi-Cummings County Water District, and only until basin adjudications in those basins become final.

^{390/} Cal. Water Code Section 1005.1 (West Supp. 1977). This section uses the language "owner of a right to extract."

supply of water from a "nontributary source"^{391/} may file a statement each year with the State Water Resources Control Board to report the amount of his groundwater reduction and substituted surface water use.^{392/} Water Code Sections 1005.2 and 1005.4 provide that a groundwater pumper who reduces or stops his groundwater pumping to permit groundwater replenishment by using water from an alternate nontributary source may file a statement with the Board.^{393/}

These sections provide that reduction or cessation of pumping because of the use of an alternate nontributary source is "a reasonable beneficial use of the ground water to the extent and in the amount that water from the alternate source is applied to reasonable beneficial use, not exceeding, however, the amount of such reduction."^{394/} In essence, this declares that non-use of groundwater is a beneficial use.

^{391/} Cal. Water Code Section 1005.1 (West Supp. 1977). "Nontributary source" is defined to include:

[W]ater imported from another watershed, or water conserved and saved in the watershed by a water conservation plan or works without which such water of the same watershed would have been wasted, or would not have reached the underground source of supply of the owner relying upon this section.

^{392/} Id.

^{393/} Cal. Water Code Sections 1005.2, 1005.4 (West Supp. 1977). It is not clear why these sections are separate. One explanation is that Section 1005.1 covers in-lieu replenishment programs, such as the one conducted by the Central and West Basin Water Replenishment District, where the district delivers surface water directly to the pumper in lieu of his continuing to pump (see discussion at page 52, above), and Sections 1005.2 and 1005.4 cover general replenishment programs. Reis, *supra* note 74, at 493 n.32, implies that Section 1005.1 may also apply when pumpers "no longer [can] take from the basin or because they [are] ... aiding in curtailing withdrawals therefrom..." even when a basin replenishment program is not being conducted.

^{394/} Cal. Water Code Sections 1005.1, 1005.2, 1005.4 (West Supp. 1977).

Filing is voluntary. In an overdrafted basin, a groundwater pumper who files can benefit to the extent that he protects his right from loss by prescription when he stops or reduces his pumping. Even before a basin becomes overdrafted, a groundwater appropriator who files can avoid losing his priority.

One problem with these statutes is that they do not provide for pumpers who have a history of pumping increasingly greater amounts every year. An increasing pumper who reduces his rate of increasing pumping by using surface water does not come within these statutes.

An additional problem involves in-lieu replenishment programs.^{395/} In these programs a groundwater pumper reduces or stops pumping and instead uses imported surface water supplies. Groundwater that he would otherwise have extracted remains in storage. If such a pumper files under Sections 1005.1 - 1005.4, he benefits rather than the importer. One commentator argues:

Water Code sections 1005.1 and 1005.2 do not refer to the ownership of the specific amount of groundwater left in the ground each year as a result of the substituted use of imported surplus waters. They refer instead only to the ownership of the underlying right to perennial groundwater. The entity bearing the cost of substituted surface water supply should logically have a claim to the resulting groundwater augmentation, and should be permitted to preserve, lease or sell its rights to these "exchange" waters.^{396/}

When Sections 1005.1 and 1005.2 were originally enacted in 1951, they applied only to specified Southern California counties.^{397/} These sections were part of the effort to halt the "race to the pumphouse" that Pasadena v. Alhambra had begun.^{398/} They generally failed to counter the Pasadena effect,

^{395/} See discussion at page 52, above.

^{396/} Gleason, supra note 263, at 665.

^{397/} Santa Barbara, Ventura, Los Angeles, Orange, San Diego, Imperial, Riverside, and San Bernardino. San Luis Obispo was added in 1972.

^{398/} Krieger and Banks, supra note 94, at 62.

because pumpers still had an incentive to increase pumping to maximize prescriptive rights.^{399/}

In 1976, these provisions were extended to the entire State.^{400/} Pumpers who want to benefit from filing under Section 1005.1 must file by the last day of each calendar year for the preceding water year.^{401/} Section 1005.1 does not provide for filing for prior years. Section 1005.4 provided that pumpers could file for years prior to 1977, if they filed by April 1, 1977. Section 1005.4 deadlines were changed by urgency legislation which became effective on March 21, 1977.^{402/} Pumpers filing under Section 1005.4 now have until December 31, 1981, to file statements for water years prior to October 1, 1981; for water years after October 1, 1981, pumpers must file by December 31 each year.^{403/}

6. Miscellaneous Statutory Provisions Relating to Groundwater

Generally, the statutory adjudication provisions in the Water Code apply only to surface water and subterranean streams flowing through known and definite channels.^{404/} In 1971, special legislation was passed which included "interconnected" groundwater supplies in the definition of "stream system" for the statutory adjudication of the Scott River in Siskiyou County.^{405/}

After receiving a petition requesting a statutory adjudication in 1970, the State Water Resources Control Board made a preliminary investigation which indicated that the flow of the Scott River was so closely connected to

^{399/} Id.

^{400/} 1976 Cal. Stats. 1523, ch. 581.

^{401/} Cal. Water Code Section 1005.1 (West Supp. 1977). A "water year" is defined as a period lasting from November 1 to October 31.

^{402/} 1977 Cal. Stats., ch. 12.

^{403/} Id. Assemblyman Chappie introduced AB 781 (1977-78 Legislative Session) on March 7, 1977, which would repeal Cal. Water Code Section 1005.4 and would repeal Section 1005.1 for all counties except for the nine counties included prior to 1976.

^{404/} Cal. Water Code Section 2500 (West 1971).

^{405/} Cal. Water Code Section 2500.5 (West Supp. 1977).

some of the groundwater in the river basin that a water rights adjudication would have to include both surface diversions and groundwater pumping to be effective.^{406/} The Board delineated the area of interconnected groundwater which would be included in the adjudication; the Board report cautioned, however:

In fact, a precise demarcation could never really be drawn because of the broad transition zones between ground water obviously not interconnected and ground water freely and completely interconnected. The demarcation lines drawn in this report should be viewed in this light and accepted as the most probable location of such a line.^{407/}

The Water Code contains specific provisions relating to artesian wells, wells from which groundwater naturally flows without being pumped.^{408/} It is a misdemeanor to allow water flowing from artesian wells to be wasted^{409/} or to have an artesian well which is not capped or equipped with a device which can stop the flow of water.^{410/}

The Board has the power, under its regulations, to investigate any public nuisance concerning artesian wells and any waste or unreasonable use, method of use, or method of diversion of water.^{411/} If it appears that a public nuisance or a wasteful or unreasonable action has occurred, the Board may allow affected persons a reasonable time to remedy the problem.^{412/} Any

^{406/} California State Water Resources Control Board, Report on Hydrogeologic Conditions, Scott River Valley at ii, Scott River Adjudication (November 1975).

^{407/} Id. at iii.

^{408/} Cal. Water Code Sections 300-311 (West 1971).

^{409/} Cal. Water Code Section 307 (West 1971).

^{410/} Cal. Water Code Section 306 (West 1971).

^{411/} 23 Cal. Admin. Code Section 764.10.

^{412/} 23 Cal. Admin. Code Section 764.11.

affected or interested person can ask the Board to hold a hearing.^{413/} If the problem involves a person who is not a permit or license-holder, the Board can ask the Attorney General to take appropriate legal action.^{414/}

In January 1977, a complaint was filed with the State Water Resources Control Board concerning groundwater pumping in the area south of Escalon, in San Joaquin County.^{415/} The complaint alleged that a number of domestic wells had gone dry, had collapsed, or had begun to pump sand because of increased agricultural pumping in the area. A member of the Board held a hearing on this matter on May 31, 1977.^{416/} The Board subsequently concluded that there was insufficient evidence to establish that the respondent growers' increased pumping had been in violation of Article 10, Section 2 of the California Constitution.^{417/}

Water Code Section 1242 provides that storing water underground, including necessary diversion and spreading operations, is a beneficial use of water if the water which is stored is later put to a beneficial use.^{418/} The State Water Resources Control Board has issued permits for underground storage for many recharge operations in the State.^{419/} These permits cover appropriation of water from local streams.

^{413/} Id.

^{414/} 23 Cal. Admin. Code Section 764.13.

^{415/} California State Water Resources Control Board, "Notice of Hearing, In the Matter of Alleged Waste, Unreasonable Use, Method of Use, or Method of Diversion of Water by Naraghi Farms, et al." (May 6, 1977).

^{416/} The hearing was held pursuant to 23 Cal. Admin. Code Sections 736.1, 764.10, and 764.11.

^{417/} California State Water Resources Control Board, Decision 1470 (June 16, 1977).

^{418/} Cal. Water Code Section 1242 (West 1971).

^{419/} E.g., Santa Clara Valley Water Conservation District, License No. 5729, to store water of Los Gatos Creek, Santa Clara County, underground; Semitropic Water Storage District, Application No. 25117, to store water of Poso Creek, Kern County, underground.

A number of districts have developed replenishment programs using imported water. Water Code Section 7075 has generally been construed to authorize these programs.^{420/} San Fernando and earlier cases applied Section 7075 to the addition to and the withdrawal of water from groundwater basins.^{421/}

E. Earlier Studies

The California Legislature has moved cautiously with respect to groundwater problems. Legislation has focused on local solutions: individual special water district acts have been amended to add basin management powers; general acts, such as the Recordation Act, have been limited in scope to a few counties in Southern California.

In 1957, the authors of the State Water Plan urged that a different approach to groundwater problems be developed:

While it is not an immediate problem, it is evident that effective administration of the development and utilization of groundwater resources, either by the State or by local agencies, or by both, will become mandatory as the stage of full water development is approached. When it becomes necessary to operate the major groundwater basins for import-export purposes, as envisioned under The California Water Plan, the requisite authority to do so must exist. Studies should be initiated now as to the adequacy of existing statutes to accomplish these ends, so that the necessary amendments and additions thereto may be made at the appropriate time.^{422/}

The authors suggested several possible approaches to the State's groundwater problems, including the establishment of a groundwater permit system and the

^{420/} Krieger and Banks, supra note 94, at 71.

^{421/} See discussion at page 71, above.

^{422/} California Department of Water Resources, Bulletin No. 3, The California Water Plan 221 (1957).

enactment of a statutory set of procedures for the conjunctive use of groundwater basins.^{423/}

In 1961-1962, the Assembly Interim Committee on Water studied groundwater problems in California.^{424/} The Committee decided not to recommend legislation, because:

In general, the committee has found no clear need for major statewide legislation at this time, but finds instead there will be a continuing need for adjustment of statutes and correction of problems as experience indicates and specific difficulties can be defined and resolved. Most of the recommendations made to the committee to expedite initiation of groundwater basin management, while seeking worthy objectives, appeared to create as many problems or inequities as they resolved. If, in the future, there are indications of major failure in any of the local ground water management programs, and it can be determined that local negligence or inaction was the cause, the Legislature would then have a basis to take major corrective action.^{425/}

The Committee concluded that a local basinwide approach to groundwater management is best:

Water agencies expressed a strong desire to solve their problems themselves and to manage groundwater basins locally. The committee agrees that local management is desirable and ... provides simplified solutions to many of the ground water basin management problems.^{426/}

The Committee noted that a number of groundwater areas in the State, such as the San Joaquin Valley, were being significantly overpumped in 1962, and that overpumping might reach "critical proportions" in the future.^{427/} At

^{423/} Id.

^{424/} Assembly Interim Committee on Water, supra note 151.

^{425/} Id. at 48.

^{426/} Id. at 46.

^{427/} Id. at 47.

that time, supplemental surface supplies were planned for and some replenishment programs were being studied.^{428/} The Committee concluded:

Groundwater problems in most of these areas will probably become worse and in a few instances become critical before public attention will be focused on them sufficiently to stimulate the local expenditures for necessary programs. The committee has found from experience to date that as ground water management problems become critical, their critical nature is recognized by the people involved and local corrective actions are taken.^{429/}

The Committee's conclusions have been challenged in an ongoing debate.

For example, one authority declared:

In my opinion, the acceleration of groundwater problems and general absence of solutions since [1962] ... have demonstrated beyond any doubt that 'ad hoc' solutions are not satisfactory. I find it curious that although regulation of surface waters is properly a responsibility of the State, groundwater regulation is somehow viewed as a 'local' concern.

....
The lack of adequate state authority in allocating water resources encourages poor local decisions, since the restrictions and conditions imposed on surface diversions are often avoided by use of groundwater supplies. The result is uncoordinated administration of interrelated resources.^{430/}

^{428/} Id.

^{429/} Id.

^{430/} Robie, Carley Porter Memorial Luncheon Address, in Proceedings Ninth Biennial Conference on Ground Water 146 (1973) (emphasis in original).

III. Issues

Groundwater basin management options vary greatly throughout California. Supplemental surface water is available in some basins and not in others. Many groundwater basins now have or will foreseeably have quantity and quality problems. In overdrafted basins, extraction costs increase, well interference problems arise, and parts of the basins may be dewatered. Overdraft may cause salt water intrusion, subsidence, connate degradation, and other problems. Quality problems can also occur in non-overdrafted basins.

The management plan for a currently non-overdrafted basin in which supplemental surface water is or will be available will necessarily differ from a management plan for an overdrafted basin in which there is no access to supplemental surface water. An additional factor to consider is that some basins now have groundwater management programs and some do not.

1. Is the groundwater data base that is now available adequate? Should provision for expanded data acquisition be made? Should the Recordation Act be expanded to apply where critical groundwater problems exist or are threatened? To all basins?

2. Should local or state groundwater data collection programs be required to be established where critical groundwater problems exist or are threatened? In all basins? What criteria should be used to identify existing or threatened critical groundwater problems?

3. Should a local entity or combination of local entities with authority over a groundwater basin, sub-basin, or series of basins be required to designate a responsible authority to prepare a groundwater management plan? Should the State be empowered to assume this role?

4. Should a new general district act be enacted which can be used to create a designated authority responsible for groundwater management planning?

Should the Joint Powers Act be amended to give joint powers agencies appropriate authority to prepare plans?

5. Should groundwater management plans be subject to local and/or state-level government approval only if groundwater will be mined? If either a mining management or safe yield management program is created? Should there be a state policy that groundwater should not be mined?

6. Should groundwater management plans include surface water allocation planning? Should groundwater replenishment with new imported surface water supplies be a preferred use in critical or threatened safe-yield management basins?

7. Should a local entity or combination of local entities with authority over a groundwater basin, sub-basin, or series of basins be required to finance and implement any necessary groundwater management plan?

8. Should a new general district act be enacted which provides groundwater management financing and implementation powers? Should the Joint Powers Act be amended to give joint powers agencies groundwater management financing and implementation powers?

There are situations in which individual pumpers do not have a clear legal remedy when their pumping is adversely affected by other pumpers. During the 1976-77 drought, for example, many domestic and small irrigation pumpers generally have not been able to prevent their wells from being dewatered as a result of the use of new, deep, high-powered agricultural wells. Where a legal remedy is clearly available, legal action may be

prohibitively expensive. Adjudicating rights can also be an extremely long process.

9. How should "overlying use", "overlying land", "groundwater basin", "groundwater sub-basin", and "series of groundwater basins" be defined?

10. Should overlying use continue to have priority over non-overlying use? How should overlying groundwater rights which have not been exercised be defined? Should they be limited?

11. Should permits be required for new wells where critical groundwater problems exist or are threatened? For new wells in all basins? For all wells, new and existing, where critical groundwater problems exist or are threatened? For all wells in all basins?

12. Should the statutory adjudication process contained in Water Code Section 2100 et seq. be extended to include the determination of groundwater rights where critical groundwater problems exist or are threatened? For all basins?

13. Should statutory provision be made for preliminary injunctions against new and increased pumping in basins in which groundwater adjudications are initiated?

14. Should Civil Code Section 1007 be amended to exclude groundwater rights from the property of public utilities, municipalities, and other public entities now exempt from prescription? If not, should the doctrine of mutual prescription be abolished?

15. On what bases should rights to groundwater be established in groundwater basin adjudications?

Interested parties have been intensively negotiating groundwater basin storage arrangements for several areas in the State. A number of basin management programs include provisions for allocation and management of available basin storage space. There is no institutional framework or statutory process for working out the issues involved in groundwater storage programs.

16. Should a system providing for imported water aquifer storage rights be created? Should a local or state permit system be used?

17. Should a statutory system of priorities for underground storage of imported water be created?

18. Should statutory authority be provided for an entity or combination of entities with jurisdiction over a groundwater basin, sub-basin, or series of basins to implement underground storage programs?

APPENDIX

A. DEFINITIONS ^{431/}

Acre foot — equivalent to the volume of water which will cover one acre of land to the depth of one foot. An acre foot of water equals 325,851 gallons. ^{432/}

Aquifer — a geologic formation that stores, transmits, and yields significant quantities of water to wells and springs.

Artesian Well — a well tapping a confined aquifer in which the static water level stands above the top of the aquifer.

Conjunctive Use, Conjunctive Operation — the coordinated operation of a groundwater basin and surface water supplies. One purpose is to artificially recharge a basin during years of above-average precipitation so that groundwater can be withdrawn during years of below-average precipitation, when surface supplies are less than normal. Conjunctive operation also refers to meeting the needs of an area through the coordinated use of surface water during years when it is available and groundwater in years when surface water is not available.

Connate Water — water entrapped in the interstices of sedimentary rock at the time it was deposited. It may have been derived from ocean or fresh water sources and, typically, is highly mineralized. ^{433/}

Culture (Land Use) — the land use or land cover existing under natural conditions or as modified by man.

Groundwater — water in the zone of saturation. Groundwater is presumed to be percolating, although it does occur in known and definite channels.

Groundwater Basin — there is no single, widely-accepted definition. See discussion below.

Groundwater, Confined — a body of groundwater overlain by material sufficiently impervious to sever free hydraulic connection with overlying groundwater except at the intake.

Groundwater, Free (Unconfined) — unconfined water is found in the zone of saturation whenever the upper surface of the zone forms a water table under atmospheric pressure, free to rise and fall with changes in volume of stored water.

Hydraulic Gradient — slope of the water table.

Hydrology — the origin, distribution, and circulation of water through precipitation, streamflow, infiltration, groundwater storage, and evaporation.

Imported Water — water transported into a watershed from a different watershed. Native water is water naturally within a watershed.

Mining — pumping from groundwater bodies greatly in excess of replenishment.

^{431.} Unless otherwise indicated, these definitions are based on California Department of Water Resources, Bulletin No. 118, California's Ground Water 4-5 (1975), and California State Water Rights Board, Referee, Report of Referee, Los Angeles v. San Fernando, Vol. I., xxvii-xxx (1962). Many of these definitions have been at issue in groundwater adjudications.

^{432.} California State Water Resources Control Board, Information Pertaining to Water Rights in California 16 (1976).

^{433.} D. Todd, Ground Water Hydrology 14 (1959).

Overdraft — the condition of a groundwater basin where the amount of water withdrawn by pumping exceeds the amount of water replenishing the basin over a period of time. San Fernando defined overdraft as the point at which "extractions from the basin exceed its safe yield plus any . . . temporary surplus".^{434/}

Percolation — the movement of water through the soil to the groundwater table.

Permeability — the capability of soil or other geologic formation to transmit water.

Piezometric Surface — the surface to which the water in a confined aquifer will rise.

Porosity — voids or open spaces in alluvium and rocks that can be filled with water.

Pump Tax, Groundwater Charge, Production Assessment, Replenishment Assessment — assessments levied on the amount of groundwater pumped.^{435/}

Recharge — flow to groundwater storage from precipitation, infiltration from streams, irrigation, spreading basins, and other sources of water.

Safe Yield — "the maximum quantity of water which can be withdrawn annually from a ground water supply under a given set of conditions without causing an undesirable result." The phrase 'undesirable result' is understood to refer to a gradual lowering of the ground water levels resulting eventually in depletion of the supply."^{436/}

Salt Water Intrusion — the movement of salt water into fresh water aquifers. See discussion below.

Specific Capacity — the volume of water pumped from a well in gallons per minute per foot of drawdown.

Spreading Water — discharging native or imported water to a permeable area for the purpose of allowing it to percolate to the zone of saturation. Spreading, artificial recharge, and replenishment all refer to operations used to place water in a groundwater basin.

Transmissivity — rate of flow of water through an aquifer.

Usable Storage Capacity — the quantity of groundwater of acceptable quality that can be economically withdrawn from storage.

Water Table — the surface where groundwater is encountered in a well in an unconfined aquifer.

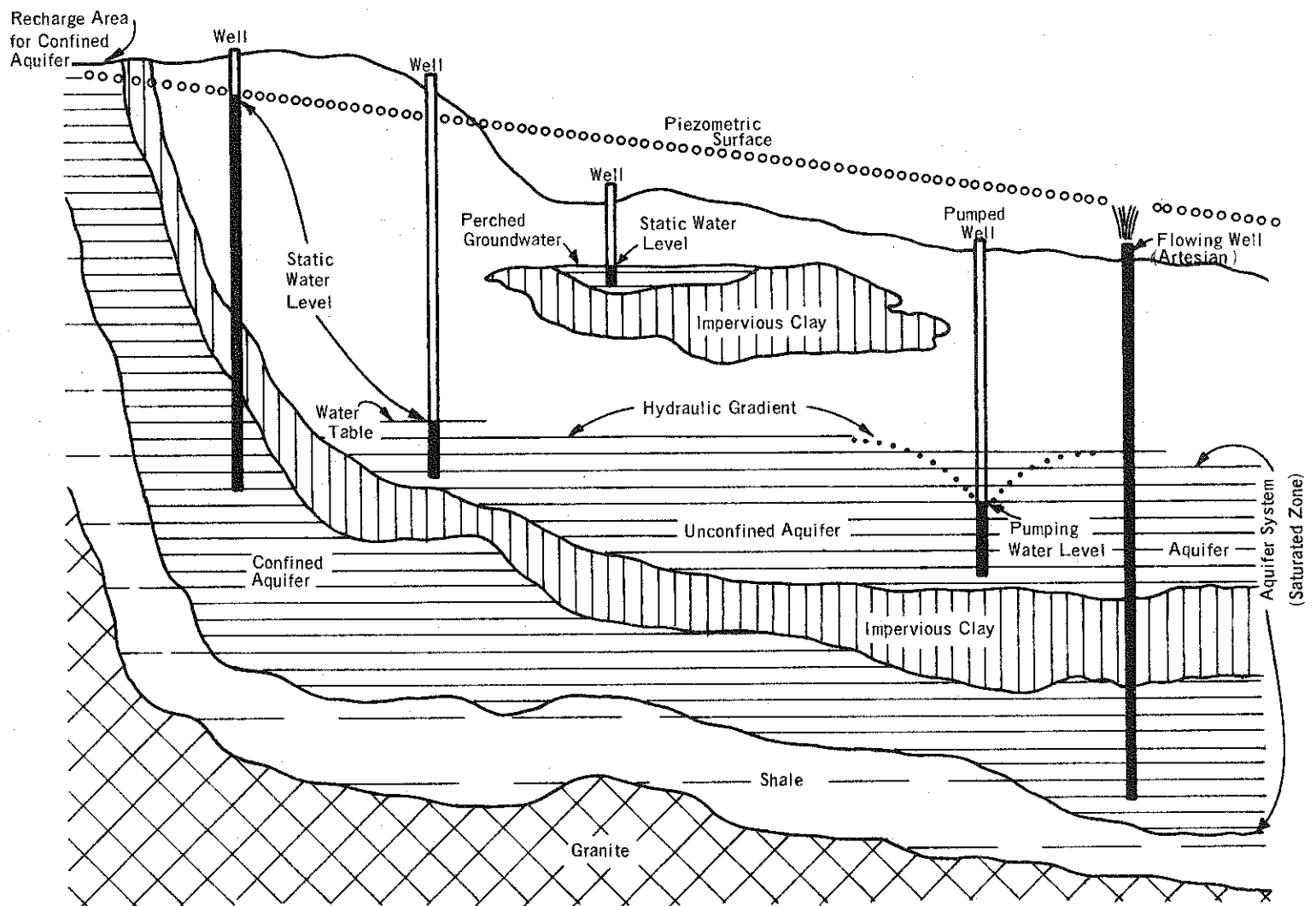
Zone of Saturation — the area below the water table in which the soil is completely saturated with groundwater.

434. Los Angeles v. San Fernando, 14 Cal.3d 199, 280, 537 P. 2d 1250, 1309, 123 Cal Rptr. 1, 60 (1975).

435. See discussion in the text.

436. Los Angeles v. San Fernando, 14 Cal.3d 199, 278, 537 P.2d 1250, 1308, 123 Cal. Rptr. 1, 59 (1975).

B. SCHEMATIC DIAGRAM ILLUSTRATING COMMON GROUNDWATER TERMS^{437/}



FREE, CONFINED and PERCHED GROUND WATER.

437. Adapted from Richter, California Ground Water Geology, in University of California Davis Extension, Concepts of Ground Water Management 2-41 (1974).

C. COMMON GROUNDWATER CONCEPTS

1. Groundwater Basin Boundaries

Many different lateral and vertical boundaries can be used to define a groundwater basin.

One compilation includes: ^{438/}

LATERAL PHYSICAL BOUNDARIES

1. Bedrock Contact
2. Zone of Low Permeability
3. Fault
4. Syncline Rim
5. Buried Bedrock Ridge
6. Constriction in Permeable Mtls.
7. Deep Underflow Constrictions
8. Aquifer Contacts
9. Crest of Anticline
10. Alluvial Embayment
11. Topographic Ridge or Divide

LATERAL HYDRAULIC BOUNDARIES

1. Ground Water Divide
2. Limit of Pressure Area
3. Shoreline of Ocean or Lake
4. Center of River or Stream
5. Unlined Canal or Reservoir

LATERAL POLITICAL BOUNDARIES

1. State
2. County
3. City
4. Irrigation District
5. Federal Installation
6. Park District

VERTICAL BOUNDARIES

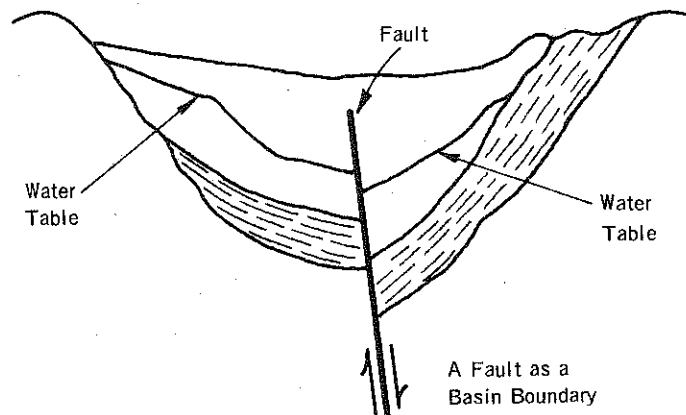
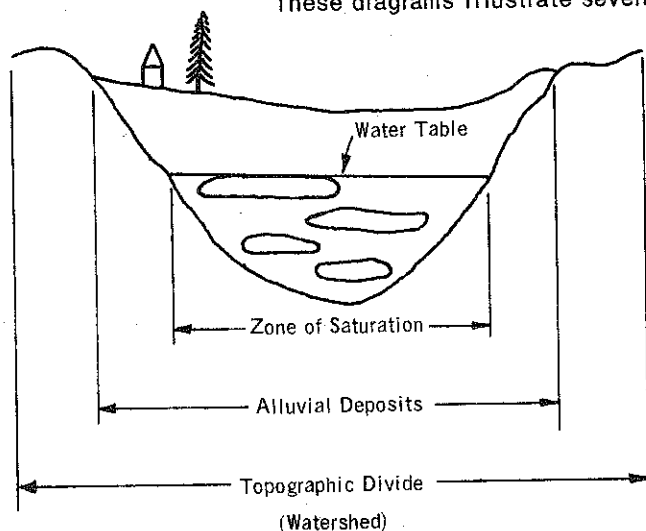
Unconfined Conditions

1. Water Table
2. Base of Water-Bearing Mtls.
3. Base of Fresh Water

Confined Conditions

1. Upper Confining Beds
2. Intermediate Confining Beds
3. Lower Confining Beds
4. Base of Water-Bearing Mtls.
5. Base of Fresh Water

These diagrams illustrate several of the possible boundaries:



2. Interrelationship Between Groundwater and Surface Water

The National Water Commission identified the problem of integrating the management of surface water and groundwater as one of three principal problems of groundwater law, management, and administration. ^{439/} The Commission outlined the need for integration:

Ground water is often naturally interrelated with surface water: ground water feeds springs and surface streams, and surface water charges ground water reservoirs. Nevertheless, there persists in the laws of many states myths (long ago abandoned by hydrologists) that ground water is separate from and unrelated to surface water. ^{440/}

The Commission recommended that "state laws . . . recognize and take account of the substantial interrelation of surface water and ground water. Rights in both sources of supply should be integrated... ." ^{441/}

438. *Id.* at 2-48

439. United States National Water Commission, *Water Policies for the Future* 232 (1973).

440. *Id.* at 233

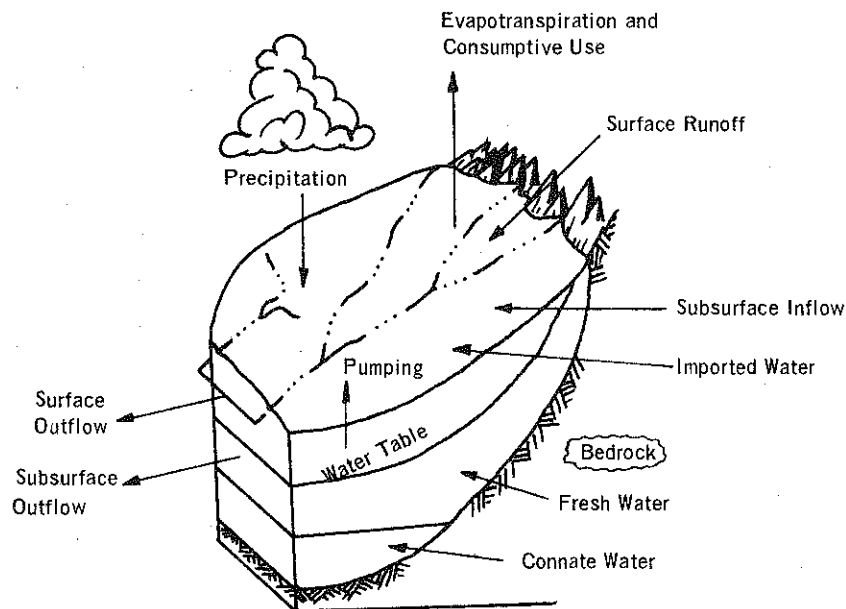
441. *Id.*

3. Elements of Safe Yield

The court in San Fernando stated:

Basically, safe yield was deemed equivalent to an adjusted figure for net ground water recharge, consisting of (A) recharge from (1) native precipitation and associated runoff, (2) return flow from delivered imported water, and (3) return flow from delivered ground water less (B) losses incurred through natural ground water depletions consisting of (1) subsurface outflow, (2) excessive evaporative losses in high ground water areas and through vegetation along streams, (3) ground water infiltration into sewers, and (4) rising water outflow, or water emerging from the ground and flowing ... down the river channel to the sea.^{442/}

These elements of safe yield are generally depicted in the following illustration:^{443/}

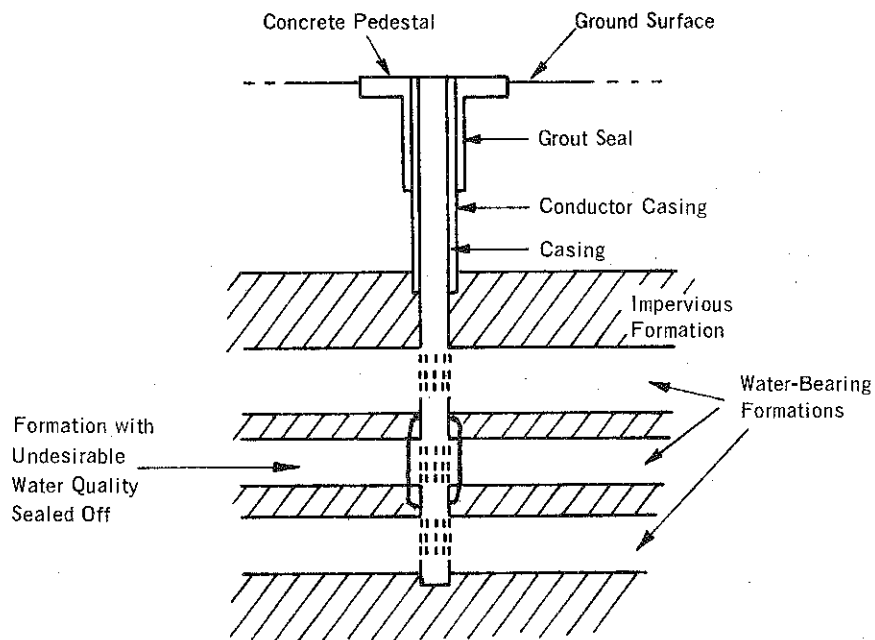


442. Los Angeles v. San Fernando, 14 Cal.3d 199, 278, 537 P.2d 1250, 1308, 123 Cal. Rptr 1, 59 (1975).

443. Adapted from Peters, Ground Water Supply Hydrology, in University of California Davis Extension, Concepts of Ground Water Management 10-4 (1974).

4. Wells

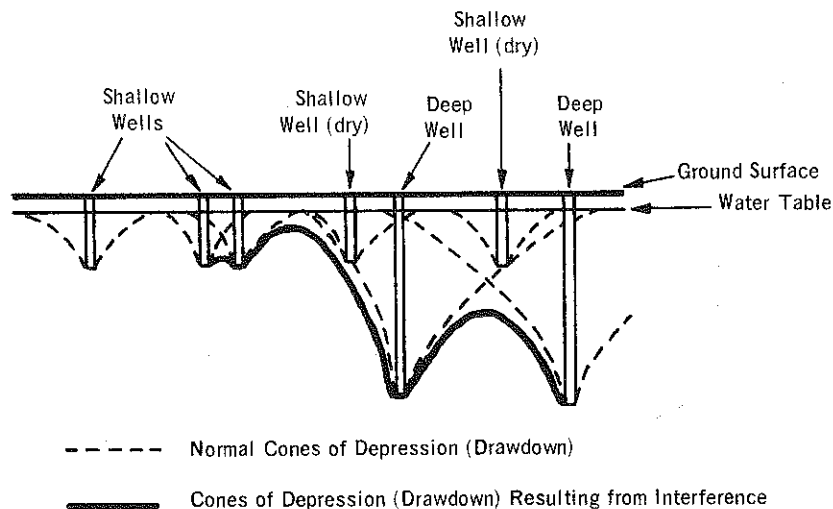
This diagram shows typical well construction features.^{444/}



Formations with undesirable water quality are sealed to ensure adequate quality for proposed uses and to prevent contamination of adjacent formations.

5. Interference Between Wells

As a result of concurrent pumping in adjacent wells, the net drawdown of groundwater levels is greater than that resulting from pumping in an individual well. This phenomenon, known as mutual interference, is illustrated as follows:



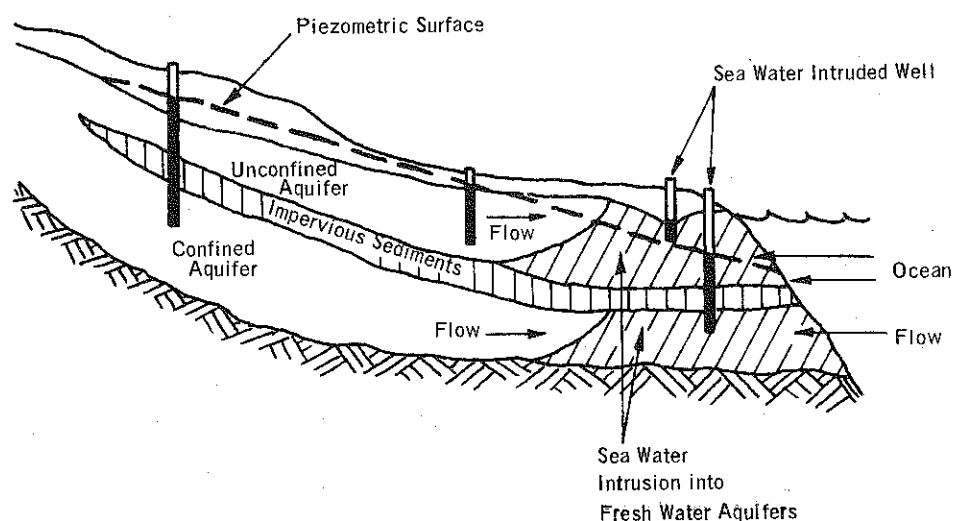
444. Adapted from Luhdorff, Water Well Design, Construction and Maintenance, in University of California Davis Extension, Concepts of Ground Water Management 8-15 (1974).

6. Salt Water Intrusion

A leading hydrologist described salt water intrusion:

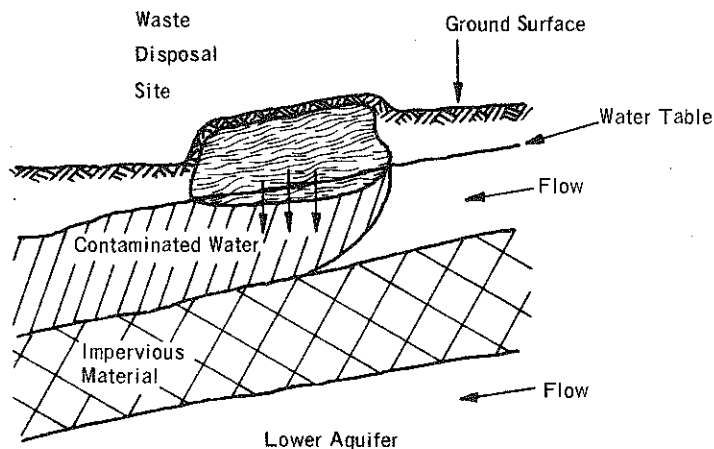
Coastal aquifers come in contact with the ocean at or seaward of the coastline and here, under natural conditions, fresh ground water is discharged into the ocean. With increased demands for ground water in many coastal areas, however, the seaward flow of ground water has been decreased or even reversed, causing sea water to enter and to penetrate inland in aquifers. This phenomenon is sea water intrusion. If the salt water travels inland in aquifers, to well fields, underground water supplies become useless; moreover, the aquifer becomes contaminated with salt which may take years to remove even with adequate fresh ground water available to flush out the saline water.^{445/}

This diagram indicates the general problem:



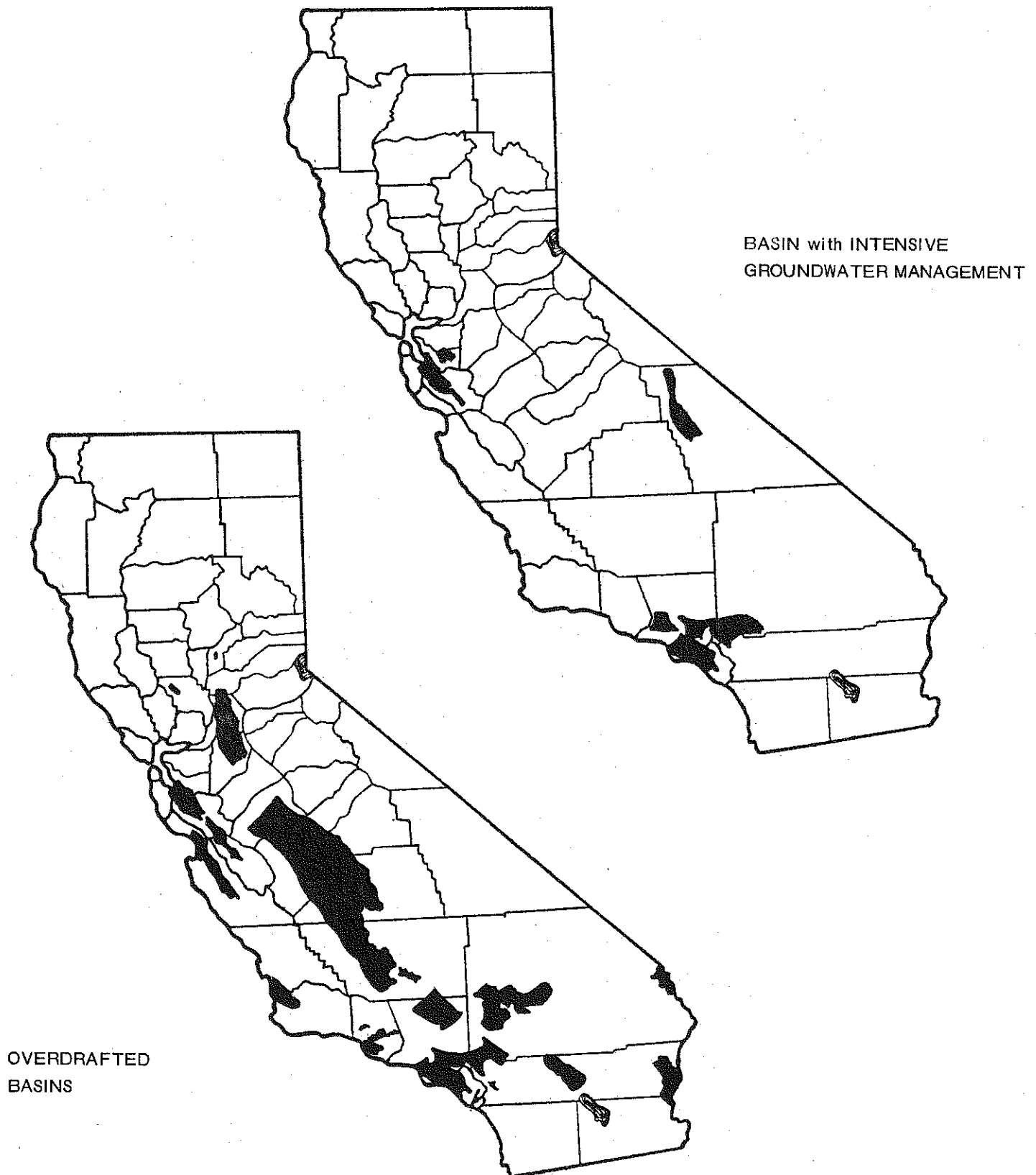
7. Contamination

Deterioration of groundwater quality can occur by injections of waste into wells, interchange between poor quality and high quality aquifers, and surface pollution. This diagram illustrates the manner in which groundwater can be contaminated by the leaching and percolation of material from waste disposal sites:^{446/}



445. Todd, *supra* note 433, at 277.

446. California Department of Water Resources, Bulletin No. 118, California's Ground Water 118 (1975).



447. Id. at 115, 121.

